SHOUT
SHARE
IT
WAKE

Bulletin 152-168 OK - RBS. 4/10/12

163 = 23d/24th Ann. Rpt 1905/1906 -? OK - RBS 4/10/12

Experiment Station Library.

Class ~~630.73~~

Number ~~A53 Cop. 3~~

Volume ~~Bulletins 152-168~~

Source

Received June 1915 (Neal)

Cost

Accession No. 3417 Ex. S.

Bulletin 163 November 1, 1912

NEW HAMPSHIRE AGRICULTURAL EXPERIMENT STATION

TWENTY-THIRD AND TWENTY-FOURTH

REPORTS

NEW HAMPSHIRE COLLEGE
OF
AGRICULTURE AND THE MECHANIC ARTS
DURHAM, N. H.

TWENTY-THIRD AND TWENTY-FOURTH REPORTS

OF THE

NEW HAMPSHIRE AGRICULTURAL EXPERIMENT STATION.

DURHAM, N. H., November 4, 1912.

To the Board of Control of the New Hampshire Agricultural Experiment Station:

I herewith submit a report of the work of the New Hampshire Agricultural Experiment Station for the biennial period from November 1, 1910, to November 1, 1912, together with the fiscal reports for the years ending June 30, 1911, and June 30, 1912.

Respectfully submitted,

J. C. KENDALL,
Director of the Experiment Station.

TABLE OF CONTENTS.

REPORT OF THE DIRECTOR 5
Financial Report July 1, 1910–June 30, 1912 9

REPORT OF THE DEPARTMENT OF AGRONOMY 13
Ear Row Tests of Corn 13
Fertilizer Tests on Grass Land 13
Alfalfa 14
Pasture Improvement 14
Timothy Selection and Breeding 14
Cooperative Experiments 15
Publications 16

REPORT OF THE DEPARTMENT OF BOTANY 16

REPORT OF THE DAIRY DEPARTMENT 17
Testing of Pure Bred Cows 17
Execution of Dairy Laws 18

REPORT OF THE DEPARTMENT OF CHEMISTRY 18

REPORT OF THE DEPARTMENT OF HORTICULTURE 20
Variety Test of Apples 20
Variety Test of Plums 21
Variety Test of Small Fruits 22
Plant Breeding 22
Tomato Culture Under Glass 22
Fruit Bud Formation 22
Plant Breeding Projects 23
Report of Work in the Greenhouses 23

REPORT OF THE DEPARTMENT OF ANIMAL HUSBANDRY 24
Sheep Breeding 24
Breeding Multi-nippled Sheep 26
Inheritance of Twins 27
Inheritance of Wool Color 27
Sheep Feeding 27

REPORT OF THE DEPARTMENT OF ENTOMOLOGY 29
Publications of the Department 30
The Apple Maggot 30
Control of Root Maggots 31
Control of Black Flies 31
Arsenic on Fruit 32
Insect Outbreaks 32
Tests of Insecticide on Sucking Insects 32

REPORT OF THE DEPARTMENT OF FORESTRY 33

REPORT OF THE EXPERIMENT STATION LIBRARY 34

PUBLICATIONS OF THE STATION, 1888–1912 35

METEOROLOGICAL RECORD, JULY 1, 1910–JUNE 30, 1912 39

NEW HAMPSHIRE COLLEGE OF AGRICULTURE AND THE MECHANIC ARTS.

NEW HAMPSHIRE AGRICULTURAL EXPERIMENTAL STATION.

DURHAM, N. H.

BOARD OF CONTROL.

HON. WARREN BROWN,	Hampton Falls
HON. N. J. BACHELDER, A. M., M. S.,	East Andover
HON. E. H. WASON, B. S.,	Nashua
W. H. CALDWELL, B. S.,	Peterboro
PRES. E. T. FAIRCHILD, LL. D., *ex-officio*,	Durham

THE STATION STAFF.

JOHN C. KENDALL, B. S., *Director, Director of Extension Work.*
FREDERICK W. TAYLOR, B. Sc. (Agr.), *Agronomist.*
FRED RASMUSSEN, B. S. A., *Dairyman.*
B. E. CURRY, A. B., *Chemist.*
W. C. O'KANE, M. S., *Entomologist.*
J. H. FOSTER, B. S., M. F., *Forester.*
J. H. GOURLEY, B. S., *Horticulturist.*
O. R. BUTLER, PH. D., *Botanist.*
J. M. JONES, M. S., *Animal Husbandman.*
C. W. STONE, A. M., *Farmer and Vice-Director.*
W. H. WOLFF, M. S., *Assistant Horticulturist.*
DAVID LUMSDEN, *Assistant in Floriculture.*
T. O. SMITH, A. B., *Assistant Chemist.*
O. L. ECKMAN, B. S., (Agr.), *Assistant Animal Husbandman.*
CAROLINE A. BLACK, PH. D., *Assistant Botanist.*
FRANK APP, B. S., *Assistant Agronomist.*
C. H. HADLEY, JR., B. S., *Assistant Entomologist.*
MABEL HODGKINS, A. B., B. S., *Librarian.*
MIRIAM L. HOBBS, *Purchasing Agent.*
M. GENEVIEVE BURT, *Bookkeeper.*
LAURA B. BICKFORD, *Stenographer.*
ELIZABETH E. MEHAFFEY, *Assistant Librarian and Mailing Clerk.*
S. EDNA DAVIS, *Stenographer.*

The bulletins of the Experiment Station are published at irregular intervals, and are sent *free* to all residents of New Hampshire requesting them.

REPORT OF THE DIRECTOR.

Changes in Station Staff.

There was but one change in the personnel of the Station Staff prior to September 1, 1912. That was due to the resignation of Mr. W. L. Slate, Jr., to accept a position as Assistant Professor of Agronomy at the University of Maine, Orono, Maine.

Dr. William D. Gibbs, President of New Hampshire College and ex-officio member of the Station Board of Control, resigned September 1, 1912, to engage in business. Dr. Gibbs came to New Hampshire College first in the fall of 1901. He was later appointed Professor of Agriculture and Director of the Station. He resigned September 1, 1902, to accept a position at the University of Texas. Dr. Gibbs was called back to New Hampshire College as president in the fall of 1903. During the nine years stewardship of Dr. Gibbs both the College and Station made marked progress as the increased enrollment of students, increased number of instructors, new buildings, and equipment bear full testimony. While this Institution, the student body, his co-workers and assistants will miss his services, advice and friendship, we all join in extending to Dr. and Mrs. Gibbs our best wishes for success and happiness in their new home.

Dr. Charles Brooks for six years Botanist to the Station and Professor of Botany in the College resigned September 1, 1912, to accept a position in the Bureau of Plant Industry, United States Department of Agriculture, Washington, D. C. The resignation of Dr. Brooks came as a distinct loss to the Station. He is author of a number of valuable Station publications and has long been an earnest, able Station worker who will be missed not alone for his services to the Institution but by his many friends and associates.

Prof. B. S. Pickett, Horticulturist to the Station and Professor of Horticulture in the College since June, 1908, resigned the first of September, 1912, to accept a position at the University of Illinios. While Professor Pickett was in charge of the Horticultural Department at this Institution the department was reorganized and the work of the department was extended in a systematic and efficient manner.

The Station lost the support of a true co-worker through the resignation of Mr. T. R. Arkell, Animal Husbandman to the Station, September 1, 1912. During the three years that he was located at New Hampshire Station he devoted most of his time to extensive sheep breeding investigations. Mr. Arkell is now located at Ottawa, Canada, and has charge of the Division of Sheep Husbandry, Live Stock Branch, of the Dominion Department of Agriculture.

Mr. J. J. Gardner, Assistant in Olericulture, resigned September 1, 1912, to accept a position at the University of Illinois.

While it was very unfortunate to have as many valuable men leave the

Station and College, and must have a detrimental effect, particularly upon the work of the Station, it is gratifying to know that these many changes were not due to dissatisfaction on the part of those leaving the Institution, but owing to the fact that they are to receive in these new positions larger remuneration for their services as well as larger opportunities. The experience of the station in losing so many good men only serves to emphasize the necessity of being able to more nearly meet the salaries paid by other similar Institutions and by the United States Department of Agriculture.

The positions made vacant by the above named resignations have been filled as follows:

Dr. O. R. Butler, formerly connected with the University of Wisconsin, was elected as Botanist to the Station and Professor of Botany in the College.

Prof. J. G. Gourley, formerly connected with the Extension Service of the Ohio State University, was appointed Horticulturist to the Station and Professor of Horticulture in the College.

Mr. J. M. Jones, graduate of the University of Wyoming and M. A. of the University of Missouri, was elected as Animal Husbandman to the Station. Mr. Jones will continue the sheep breeding investigations.

Mr. Frank App, connected with the Extension Service of the Pennsylvania State College, was elected Assistant Agronomist.

Administration.

There has been no marked change in the general policy respecting the Station work during the period covered by this report. The general work of the Station has been conducted along lines much the same as heretofore.

There has been an attempt made to separate more distinctly than formerly the time of instructors and investigators devoted to College and Station work. By such a plan it was believed that more effective work would be possible both in the class rooms and in the fields of research. There has also been established a more equitable division of salaries, that is to say, more strictly in accord with the time actually devoted to College and Station duties. This is more just to both College and Station employees since it places each man's work in a clearer and truer light. In some instances separating the duties of College and Station employees entirely would be desirable. It is not often that our best and most efficient investigators are qualified either by inclination, equipment, or personality for attaining the greatest success in the class room. It is equally true that the most gifted, best qualified, and most successful teachers would frequently be unsuccessful in the field of research. Then, too, the duties of both lines of work are so exacting as to time that there also enters into the situation the physical impossibility of the College and Station workers being in two places at the same time, which frequently under the dual role would necessitate the neglect of either the College or Station duties.

The introduction of Extension work as a recognized part of the New Hampshire College and Experiment Station September 1, 1911, under a separate state appropriation, has called for a still further division of the time of College and Station workers. This has been especially true since the initial appro-

priation for the Extension Service has been too small to permit the paying of salaries to a separate Extension staff.

The Director of the Experiment Station was appointed by the Board of Trustees, Director of Extension work. While this might not be a desirable arrangement in some of our larger Institutions receiving liberal appropriations for the different lines of work, it possesses advantages at this Station where the majority of those engaged in agricultural work have to divide their attention and time to some extent, at least, between teaching, investigation, and extension work. The general correspondence relating to agricultural work is now sent to one office for attention. These letters very frequently combine a request for Station literature, requests that names be placed upon the permanent mailing list, together with questions relating to general agriculture of every conceivable kind.

This arrangement combines the Extension Service so closely with the instructional and investigational work of the various departments that it has the advantage of making all of the teachings and relations of this Institution with the citizens of the State uniform avoiding in this way some of the serious difficulties experienced by Institutions where the work of the College Station, and Extension Service have become more clearly separated and distinct.

In the writer's judgment there is a point in the development of agricultural departments in all Institutions where the work may advantageously be coördinated along the lines of instruction, research, and extension. For example, all work under horticultural lines, should very properly be done as a part of and largely under the direction of the Horticultural Department. The same would be equally true of Agronomy and Animal Husbandry work of the Institution as well as in other agricultural departments which have not been mentioned. Under existing conditions owing to a lack of sufficient funds in order to enable the different lines of work at this Institution to be more clearly defined the present arrangement for carrying on the various activities are probably as satisfactory and efficient as any other plan that could be devised.

The Station has established the policy of concentrating the best efforts of each department upon one main line of experimentation. This is especially true of Adams Fund projects. In a general way it is the policy of the Station to allow one main Adams Fund project in each department and to reduce the number of Hatch projects sufficiently to allow careful and intensive consideration to be given to all projects that are being conducted and to transfer to the Extension Service some of the work which has been conducted heretofore as a part of the work under the Hatch Fund. This has reference largely to the many variety tests that have been conducted in the Horticultural Department with Hatch Funds.

There has been introduced into the Station records a card inventory system which not only keeps the inventory records up to date at all times, but lists items in a convenient form for reference under the proper headings as required on Station vouchers, which will supply detailed information with reference to the Station inventory at all times. Files of inventory cards of all Station

property is kept in the general Experiment Station Office and duplicate cards are sent to the different departments containing the information with reference to departmental Station property.

All of the Station cuts that have been used in publications have been filed in suitable cabinets with card references bearing a reproduction of each cut with a place for suitable records, in case for any reason, it is necessary to remove any of the cuts from their proper place in the filing cabinet.

New sets of filing binders have been placed in the Station library for holding in temporary bindings, publications as they are received from other Stations, where they are kept in proper sequence and from which they cannot be readily removed or misplaced until secured in the permanent bindings. An attempt is being made to keep on file complete and up-to-date sets of Station literature, Government and other important publications in uniform bindings.

Our mailing list has increased quite rapidly during the biennial. We have added over 2,500 names to the permanent mailing list of the Station. These names have been placed on stencils so that they may be used in the addressing machine.

A change has been made in the system of keeping Hatch and Adams accounts that will allow for the separating of the Hatch and Adams sales accounts from the general miscellaneous account of the Station. It is the practice now to have all of the money received from sales used, so far as possible, directly in the interests of that particular Hatch or Adams Fund project that is responsible for creating the Sales Fund. We have found this plan, while requiring a little more work in the office, has been decidedly in the interests of the more efficient use of Station funds.

Land for Experimental Purposes.

One of the most serious handicaps to the work of the New Hampshire Agricultural Experiment Station at the present time is the lack of sufficient land suitable for conducting field investigations.

The soil on the College farm is variable as to its composition and uneven to such an extent that satisfactory field tests are practically impossible. Aside from the plots upon which long-time fertilizer tests on grass are being conducted, there is no land upon the College farm that is well adapted to experimental purposes. There is no soil on the College farm that is suitable for growing large crops of either corn or potatoes even though it were uniform in composition and level enough to permit its use for experimental work. This lack of good farm land adapted to investigation is a very serious handicap to the work of the Station and accounts in a large measure at least for the Station not having under way a larger number of field tests. Not only is the College farm lacking in land answering the requirements mentioned above, but there is apparently no land possessing such qualifications within reasonable distance of the College that can be purchased or rented.

New Hampshire agriculture bears ample testimony to the need for conducting cultivation tests and crop rotation investigations which will help to solve the real agricultural problem, which is to maintain and increase the fertility, and hence the productive power of our soils more economically. The average

New Hampshire farmer is not keeping as many head of live stock as formerly; consequently, less stable manure is available. Partly as a result of this fields are left in grass for a much longer time and are less productive when plowed and planted to other crops. The question of meeting these conditions most effectively is, in the writer's judgment, the most important line of study confronting the Station today. It is also one of the most difficult projects to undertake under present Station conditions owing to a lack of land suitable for the purpose. Such a problem should be under investigation for a number of years and would involve considerable expense, which its importance would justify.

The introduction of Extension work as a part of the duties of the College and Station Staff calls for increased activity on the part of the Experiment Station and in fact intensifies the importance of Station work. In spite of the popularity of the Extension movement all over the country, the importance of this line of work depends and must continue to depend upon the amount and quality of Station work. Investigational work must precede the Extension work and it must anticipate Extension work by a number of years if it is to render its best service to the Extension division and hence to New Hampshire agriculture and to the citizens of the State.

TWENTY-THIRD ANNUAL REPORT TO THE UNITED STATES GOVERNMENT OF THE HATCH FUND.

For the year ending June 30, 1911.

Receipts.

Cash received from United States treasurer	$15,000.00

Expenditures.

Cash paid for salaries	$6,946.36
labor	1,609.44
publications	1,609.24
postage and stationery	558.66
freight and express	240.16
heat, light, water, and power	1,045.30
chemicals and laboratory supplies	76.49
seeds, plants, and sundry supplies	455.98
fertilizers	363.16
feeding stuffs	256.11
library	471.19
tools, machinery, and appliances	54.81
furniture and fixtures	522.18
scientific apparatus and specimens	268.33
live stock	11.60
traveling expenses	443.77
contingent expenses	25.00
buildings and land	42.82
	$15,000.00

SIXTH ANNUAL REPORT TO THE UNITED STATES GOVERNMENT OF THE ADAMS FUND.

For the year ending June 30, 1911.

RECEIPTS.

Cash received from United States treasurer	$15,000.00

EXPENDITURES.

Cash paid for salaries	$9,461.03
labor	2,549.25
postage and stationery	50.10
freight and express	46.83
heat, light, water, and power	7.98
chemicals and laboratory supplies	297.54
seeds, plants, and sundry supplies	551.98
fertilizers	51.34
feeding stuffs	712.35
library	34.74
tools, machinery, and appliances	12.38
furniture and fixtures	3.00
scientific apparatus and specimens	325.21
live stock	111.10
traveling expenses	374.92
buildings and land	410.25
	$15,000.00

SUPPLEMENTARY STATEMENT OF FUNDS OTHER THAN THE HATCH AND ADAMS FUNDS.

For the year ending June 30, 1911.

RECEIPTS.

Cash received, analytical fees, etc	$5,381.03

EXPENDITURES.

Cash paid for salaries	$733.32
labor	2,248.14
publications	27.38
postage and stationery	64.38
freight and express	65.40
heat, light, water, and power	118.61
chemicals and laboratory supplies	178.87
seeds, plants, and sundry supplies	684.38
fertilizers	201.17
feeding stuffs	114.45
library	10.00
tools, machinery, and appliances	42.09
furniture and fixtures	113.35
scientific apparatus and specimens	76.43
traveling expenses	544.31
contingent expenses	9.75
buildings and land	2.72
Balance	145.83
	$5,381.03

TWENTY-FOURTH ANNUAL REPORT TO THE UNITED STATES GOVERNMENT OF THE HATCH FUND.

For the year ending June 30, 1912.

Receipts.

Cash received from United States treasurer	$15,000.00

Expenditures.

Cash paid for salaries	$8,146.22
labor	1,665.33
publications	669.37
postage and stationery	507.33
freight and express	279.98
heat, light, water, and power	667.95
chemicals and laboratory supplies	44.51
seeds, plants, and sundry supplies	329.43
fertilizers	242.35
feeding stuffs	215.52
library	607.87
tools, machinery, and appliances	177.09
furniture and fixtures	302.22
scientific apparatus and specimens	523.83
traveling expenses	340.31
contingent expenses	25.75
buildings and land	254.94
	$15,000.00

SEVENTH ANNUAL REPORT TO THE UNITED STATES GOVERNMENT OF THE ADAMS FUND.

For the year ending June 30, 1912.

Receipts.

Cash received from United States treasurer	$15,000.00

Expenditures.

Cash paid for salaries	$9,349.19
labor	2,989.18
postage and stationery	64.35
freight and express	56.90
chemicals and laboratory supplies	146.08
seeds, plants, and sundry supplies	307.87
fertilizers	192.67
feeding stuffs	752.94
library	17.83
tools, machinery, and appliances	70.41
furniture and fixtures	33.92
scientific apparatus and specimens	427.01
live stock	62.32
traveling expenses	343.12
buildings and land	186.21
	$15,000.00

SUPPLEMENTARY STATEMENT OF FUNDS OTHER THAN THE HATCH AND ADAMS FUNDS.

For the year ending June 30, 1912.

Receipts.

Balance on hand June 30, 1911	$145.83
Cash received, analytical fees, etc	4,905.31
	$5,051.14

Expenditures.

Cash paid for salaries	$991.70
labor	1,730.96
publications	6.00
postage and stationery	17.03
freight and express	8.63
heat, light, water, and power	67.98
chemicals and laboratory supplies	165.34
seeds, plants, and sundry supplies	276.73
feeding stuffs	21.20
tools, machinery, and appliances	11.90
furniture and fixtures	56.28
scientific apparatus and specimens	55.47
traveling expenses	183.06
contingent expenses	1,011.29
buildings and land	41.04
Balance	406.53
	$5,051.14

AUDITOR'S STATEMENT.

The undersigned, duly appointed auditor of the corporation, hereby certifies that he has examined the books and accounts of the New Hampshire Agricultural Experiment Station for the two fiscal years ended June 30, 1912; that he has found the same well kept and classified as above, and that the receipts for the two years from the treasurer of the United States are shown to have been $30,000 and $30,000, respectively, and the corresponding disbursements, $30,000 and $30,000, respectively, for all of which proper vouchers are on file and have been examined and found correct.

And it is further certified that the expenditures have been solely for the purposes set forth in the acts of Congress approved March 2, 1887, and March 16, 1906.

(Signed) C. H. Pettee,
Auditor.

Attest:

Walter M. Parker,
Custodian.

REPORT OF THE DEPARTMENT OF AGRONOMY.

F. W. TAYLOR.

ORGANIZATION AND EQUIPMENT.

No important changes in the organization of this department have been made since the last biennial report. The experimental work with fertilizers on potatoes, however, has recently been transferred to this from the Department of Horticulture.

Mr. W. L. Slate, Jr., after two years of service resigned the position of Assistant Professor of Agronomy October 10, 1911, to accept a similar one at the University of Maine. He was succeeded by Mr. Frank App (Pennsylvania State College, '11), who now holds the position in both Station and College.

In the matter of equipment the most important additions have been the leasing of a plot of fairly uniform soil for experimental work; the fitting up of rooms for mixing and storing fertilizers, and for drying and storing seed corn; also a tool and apparatus room with various minor conveniences.

HATCH FUND PROJECTS.

Ear Row Tests of Corn.

This work was begun in 1907 with Minnesota 13, a yellow dent type secured from the Minnesota Experiment Station. The objects and outline of the project was printed in the last report. The work with the dent corn is still being continued with very promising results. Last year we obtained a cross known as "N. H. 500" which matured this season in 110 days. By the method of selection and breeding used the earliness of the strain has been increased, with a slight diminution, however, in the size of the stalk and ear.

In 1912 a similar line of work was begun with flint corn which it is proposed to continue for at least seven years for the purpose of increasing the yield and maturity of the best strains of that type.

Fertilizer Tests on Grass Land.

The various chemical fertilizers and manures were applied May 6, and the grass cut July 6 and 7, 1911. The average yield of the "no fertilizer" plots was .824 tons per acre. The largest yield was 1.44 tons with an application of 400 pounds per acre of nitrate of soda. The smallest was .54 with an application of 600 pounds per acre of land plaster.

In 1912 the fertilizers were applied May 2, and the grass cut July 8. The average yield of the "no fertilizer" plots was 1.381 tons per acre. The heaviest yield was 2.618 tons per acre with an application of 400 pounds of nitrate of soda; the lightest was .94 with 600 pounds per acre of land plaster. No second crops of grass were cut in either 1911 or 1912. In May, 1912, an

application of "lime marl" was made to one half of all the plots, but neither from this or the previous application of "agricultural lime" has any effect been noted.

The following table will show the comparative average yield of hay from the plots which have been fertilized the same each year for the period of six years during which the experiments have been conducted.

COMPARATIVE AVERAGE FOR 1907, '08, '09, '10, '11 AND '12.

	Application per acre.	Hay per acre.
Nitrate of soda	200 lbs.	2.392 tons.
Sulfate of ammonia	150 "	2.037 "
Tankage "9-20" grade	175 "	1.884 "
Land plaster	450 "	1.520 "
Nitrate of soda	400 "	2.753 "
Sulfate of ammonia	300 "	2.318 "
Tankage "9-20" grade	350 "	1.964 "
Acid phosphate 14%	430 "	1.823 "
Rock phosphate	220 "	1.544 "
Basic slag	350 "	2.028 "
Ground bone	220 "	2.095 "
Muriate of potash	120 "	1.721 "
Sulfate of potash	125 "	1.838 "
Wood ashes	900 "	1.980 "
Manure	10 tons.	2.094 "
Nitrate of soda	200 lbs.	2.306 "
Acid phosfate	215 "	
Nitrate of soda	200 "	2.376 "
Muriate of potash	60 "	
Acid phosfate	215 "	1.703 "
Muriate of potash	60 "	
Nitrate of soda	135 "	
Acid phosfate	145 "	2.066 "
Muriate of potash	40 "	
No fertilizer		1.723 "

Alfalfa.

In the spring of 1911 the plots seeded in August, 1909, and 1910, were so badly killed out that they were plowed up. From the plot seeded in August, 1911, two cuttings were made this season. A very good catch was secured in about two thirds of this plot, the other third being badly infested with witch grass.

In August, 1912, thirteen plots 12 feet square were planted with seed of different strains and from different sources to test their yields and hardiness.

Pasture Improvement.

The object of this experiment was to determine to what extent, by what means, and at what expense the average New Hampshire pasture can be improved. The work has been in progress four years and was completed October 1 of this year. The results will be published in bulletin form during the coming winter.

Timothy Selection and Breeding.

This project was begun this season, 1,200 individual plants being set out in separate hills.

The objects of this experiment are, *first*, to secure data on the variations in the growth of the individual timothy plant; *second*, to study these said variations; *third*, to select and isolate strains or individuals possessing the desired characters; *fourth*, to propagate these individuals by close breeding; *fifth*, to compare plants from close pollinated seed with plants propagated vegetatively from same mother plant; *sixth*, to obtain sufficient seed of valuable strains to sow under field conditions; *seventh*, to plant isolated plots from inbred seed and obtain seed for planting larger areas in order to grow sufficient pure-bred seed for distribution among farmers of the state.

This work will be conducted by planting the individual plants in rows four feet apart and forty inches in the row. Forty plants are planted from each strain, making the plot for each strain sixty-seven feet long and eight feet wide. Every third plot is a check plot. The seed from the check was a standard strain selected for that purpose. The different strains were obtained from the Pennsylvania Station, the Cornell Station, the United States Department of Agriculture, and commercial sources.

III. COÖPERATIVE EXPERIMENTS.

Hay Production.

The coöperative experiments on methods of increasing the yield of hay begun in 1910 have been continued as outlined in the last report.

The following table shows the average yield of hay in pounds per acre for three years for each of the first four treatments, for two years for the reseeded plot and for one year for the cultivated plot:

Name and address of coöperator.	Nitrate Plot.	Complete Fert. Plot.	Manured Plot.	No. Fert. Plot.	Re-seeded Plot.	Cultivated Plot.
H. S. Townsend, Lebanon	4,365	4,044	3,469	2,257	2,369	4,382
D. T. Atwood, Plymouth	2,553	3,077	2,778	1,464	1,756	2,180
E. H. Smith, E. Haverhill	4,503	5,350	4,523	3,343	3,570	4,460
J. B. Foster, Quincy	2,624	2,970	2,585	1,313	1,882	1,840
Nelson Merrow, Lancaster	4,185	4,295	3,192	2,480	2,734	4,868
Royal Jordan, Colebrook	2,113	2,307	1,526	1,053	1,220	
Walter Eaton, Whitefield	3,300	2,500	1,790	1,520	1,800	
General Average	3,377	3,506	2,837	1,918	2,190	3,546

Some coöperative work with fertilizers similar to the above was begun this year on the county farms at Ossipee and Claremont, and some interesting results have already been obtained.

Corn Tests.

For the purpose of finding out what strains of corn are best adapted to the several sections of the State a series of tests were begun this year in coöperation with the county farms in the counties of Rockingham, Hillsborough, Merrimack, Cheshire, and Sullivan, also with the farm of the School for Feeble-Minded in Belknap County, and with the New Hampshire College Farm in Strafford County.

As a basis for this work an effort was made to secure seed of the best and most representative strain of corn grown in each of the above-named counties. A quantity of seed of each strain sufficient to plant one-twentieth to one-tenth of an acre was sent to each of the counties coöperating. The different strains were planted side by side in each of the localities, and data concerning their comparative yields, maturity and general adaptability to that particular section are thus secured.

It is hoped to continue this work for several seasons and to enlist the coöperation of all the county farms of the state. When the best strains have once been found out a definite system of selection and breeding for their improvement will be begun.

PUBLICATIONS.

The publications issued by the department in bulletin or circular form during the past two years are as follows:

Purchase and Home-mixing of Fertilizers, Circular No. 12, February, 1911.
Selecting and Storing Seed Corn, Press Bulletin, December, 1911.
Corn Tests at County Farms, Press Bulletin, February, 1912.
Analyzing Soils for Fertilizer Needs, Press Bulletin, March, 1912.
Improvement of Hay Lands, Press Bulletin, April, 1912.
Alfalfa in New Hampshire, Extension Circular, May, 1912.
Results of Seed Tests, Bulletin No. 156, February, 1912.

The last-named publication gives the results of 72 seed examinations made during the year under the provisions of the new State Pure Seed Law. The agronomist of the station has been appointed the agent of the secretary of the State Board of Agriculture, who has charge of the administration of the law, and has been instructed to make the official tests and publish the results annually as a regular bulletin of the Experiment Station.

REPORT OF THE DEPARTMENT OF BOTANY.

O. BUTLER.

During the biennium ending November 1, 1912, the investigations carried on by the Department of Botany have been generally confined to the continuation of the studies of which some mention was made in the Twenty-first and Twenty-second Report of this Station.

The studies on the diseases of apples that were in progress at the time of the last report have been brought to a close and the results published,* with the exception of a contribution on the Leaf Spot of the Apple, which will shortly be forthcoming. The leaf spot of the apple is a common disease in

*Brooks, C., and Black, C. A. Apple Fruit Spot and Quince Blotch. Phytopathology **2**: 63–72. 1912. Also New Hampshire Agr. Expt. Sta., Scientific Contribution, 5.
Brooks, C. Some Apple Diseases and Their Treatment. New Hampshire Agri. Expt. Sta. Bull., **157**: 32 pp. 1912.

New Hampshire and the contribution in course of preparation is devoted to a study of the organism, *Sphaeropsis malorum*, Berk, producing this disease. Some strains of *S. malorum* differing in their pathogenicity have been isolated and studied. Two of the strains are weakly pathogenic and are distinguished from one another mainly in their pycnidial characters: in one the pycnidia are simple, in the other two or more loculate. The pathogenic strain has large oblong spores, the weakly pathogenic strains, have, on the other hand, small ovate spores.

The studies on the blossom end rot of the tomato, a disease of considerable economic importance, are also nearing completion and will be published in all probability during the fiscal year, 1912–13.

The experiments with Bordeaux mixtures, both freshly prepared and proprietary, as well as several other fungicides which were begun in 1907 have been brought momentarily to a close. The results obtained, which may be briefly summarized as follows, will be presented at length in a forthcoming bulletin.†

Bordeaux mixture was the most efficient of the fungicides experimented with, and they included the form of wetable sulphur advocated by Scott for the control of peach diseases and several proprietary sulphides of lime. As the injurious action of Bordeaux mixture on the foliage and fruit of the apple has not yet been overcome this wash cannot be unqualifiedly recommended when the production of fruit free from blemishes, *i. e.*, spray injury, is desired. The lime sulphides which have little or no injurious action have been recommended in lieu of Bordeaux mixture but as their fungicidal value is of rather a low order too much reliance should not be placed on them in years favorable to the development and spread of parasitic fungi. It should be noted, however, that while the proprietary lime sulphides are of equal, if not superior quality to similar washes prepared on the farm, the same is by no means true of Bordeaux mixture, the proprietary wash is a less efficient fungicide than the mixture prepared when needed.

REPORT OF THE DAIRY DEPARTMENT.

FRED RASMUSSEN.

During the past two years the Dairy Department has not been officially connected with the Experiment Station.

The department has, however, taken care of considerable correspondence, supervised the official testing of dairy cows and execution of dairy laws.

Testing of Pure Bred Cows.

Requests have been received from several breeders of Guernsey, Jersey, Holstein and Ayrshire cattle for the supervision of the Station in conducting

†Brooks, C. Fungicides in the Apple Orchard. New Hampshire Agri. Expt. Sta. Bull., **161**: 15 pp. 1912.

weekly or yearly tests of their animals under the rules of their respective associations. Since the issuing of the last biennial Report, the following tests have been completed: 60 Holstein, 21 Ayrshires, 4 Guernseys, and 14 Jerseys, a total of 99 as compared with a total of 74 for the two previous years.

Execution of Dairy Laws (Act of 1901).

The act demands that any person who operates the Babcock test, or any other test, for determining the butter-fat or solids in milk and cream, as a basis for apportioning the value of same, must hold a certificate from the proper Station official showing the holder competent and well qualified to perform such work. The law further provides that all glassware used in connection with the testing must be tested for accuracy of graduations.

During the last two years fifty-eight candidates have been examined and granted milk-testing certificates.

Seventeen hundred and eighty-two pieces of glassware were examined for accuracy of graduation of which eight pieces were inaccurate or defective.

There are many problems both along the line of the production and handling of milk as well as in the manufacturing of dairy products, the investigating of which would be of benefit to the dairymen in the State.

At the present time the bacteriology laboratories in the Dairy Department are being equipped and it is expected that by another year this department will again be connected with the Experiment Station.

REPORT OF THE DEPARTMENT OF CHEMISTRY.

B. E. CURRY.

The department has carried on investigations along the following lines since the last report:

(a) Soil Potash Work.

(b) Grass Production.

(c) Lime Requirements for New Hampshire Soils.

To date the following brief statements show the results obtained in the soil potash work:

1. A large amount of potassium fertilizer is not used profitably at the present time.

2. New Hampshire soils are rich in potassium and naturally adapted to the production of hay.

3. The soil potassium is present as clay and in mineral form.

4. The soils remove large quantities of potassium from solution under both laboratory and field conditions.

5. When potassium phosphate reacts with the soils no new soluble salts appear in solution.

6. When other potassium salts react with the soil new bases do appear in solution.

7. Excepting phosphoric, the solubility of the common acid readicals is not affected by the action of the soil.

8. The effect of such salts as sodium chloride, sodium nitrate, sodium carbonate and acid phosphate is to greatly increase the solubility of the soil potassium.

9. The reaction between these salts and the soil is chemical.

10. Calcium carbonate, calcium sulphate and calcium oxide have practically no effect on the solubility of soil potassium.

11. The feldspar minerals have a definite solubility in water. This solubility is affected by lime and the common salts found in fertilizers. The effect of these is modified by the presence of clay.

12. Field observations show that potassium fertilizers do not produce increased yields of grass particularly on clay soils. In some combinations they are more effective on the sandy soils, but not profitably so.

13. In many cases nitrate of soda alone produces yields as good as are obtained with a combination of nitrate of soda and potassium salts. This may be due to the effect of the nitrate of soda on the soil potassium.

14. The composition of the hay shows that when no potassium fertilizers are used the soil affords plenty of potassium for the growth of the crop. This is true for large yields.

15. From a practical point of view little profit can be expected from the use of potassium fertilizers for the production of hay.

These statements are taken from Volume 15, page 70, original communications, Eighth International Congress of Applied Chemistry, and constitute a summary of the results reported there. The facts discussed in this paper have a very practical bearing on the economical production of grass.

The department has also published a technical paper on a short method for the determination of soluble arsenic in commercial lead arsenate. Journal of Industrial and Engineering Chemistry, Vol. 4, 1912. A method is given whereby the time necessary for the determination may be shortened very materially over that required by other methods.

The coöperative work on grass production shows the universal need of more nitrogen. Nitrogen is found to be one of the chief limiting factors in the production of large yields. The need of more cultivation and better methods of fertilization has been found.

Under the Adams Act no new work has been undertaken. The facilities and personnel have undergone no change since the last report. The present status of this work is represented by the report above cited. No general conclusions can yet be drawn from the lime work.

The department is required to do a larger amount of miscellaneous work from year to year. During the past year the total numbers of fertilizers and feeding stuffs have practically doubled in number.

REPORT OF THE DEPARTMENT OF HORTICULTURE.

J. H. GOURLEY.

ORGANIZATION.

The experimental work of the Department of Horticulture has been carried on during the past two years under the supervision of the head of the department, Prof. B. S. Pickett, assisted by men in the several branches of pomology, olericulture and floriculture. No changes occurred in the staff of the department during the past two years.

On the first of August, 1912, Prof. B. S. Pickett accepted the position of Professor of Pomology at the Illinois Agricultural Experiment Station and was succeeded in September, 1912, by J. H. Gourley, B. S., Assistant Professor of Horticulture, Ohio State University, as Horticulturist.

In August, Mr. J. J. Gardner, Assistant in Olericulture, resigned his position to accept the position of Assistant Horticulturist at the Illinois Agricultural Experiment Station. W. H. Wolff, Assistant in Pomology, and David Lumsden, Assistant in Floriculture, remain in the department.

INVESTIGATIONS UNDER HATCH ACT.

Variety Test of Apples.

The variety test apple orchard, known as the Thompson Orchard, now contains 375 trees. Thirty-five varieties, comprising nearly all the older New England standard sorts and many of the more prominent newer kinds, are being tested under similar conditions. The oldest of the trees of the hardiest and more thrifty varieties have now completed their eleventh season of growth and in some instances have a spread of ten feet with an average height of eight to nine feet. This is not extraordinary but considering the partial neglect of the trees during the first seven years it is to be considered fair. Additions and replacements have been made from time to time and thus the orchard presents a rather irregular appearance with trees ranging in ages from one to eleven years.

The general aim of the work during the past two years has been to get the trees into a healthy condition, to stimulate growth, establish by corrective and vigorous pruning, when necessary, a low open and spreading head, and to develop fruit spurs. From now, especially on the older trees, there will be less heading-in since the form has been established and beginning next year largely increased crop production may be expected.

The trees have been sprayed regularly for the common insects and fungus diseases and so far no scab has developed on the three successive crops which the McIntosh trees have produced, although this variety is notably susceptible to this fungus. The trees have also been systematically examined for borers. The green apple aphis (Aphis mali) was abundant during the summer of 1912, as they were in nearly all orchards in southern New Hampshire. Preliminary

spraying tests were first conducted and following these all the trees in the orchard were sprayed three times at intervals of about two weeks, the first time with commercial lime-sulphur, one part to 75 of water, and the second and third times with nicotine sulphate at the rate of 1 part to 800. All three of these sprayings proved efficient and by them the trees were kept quite free from lice.

Immediately after the first harrowing, during each of the last two years, each tree has been fertilized individually using from $1\frac{1}{2}$ pounds to the smallest tree to $5\frac{1}{2}$ pounds for the largest of the following mixture:

200 pounds nitrate of soda.
400 pounds tankage.
400 pounds basic slag.
200 pounds sulphate of potash.

The entire orchard was also lightly manured during the spring of 1912, this with more particular reference to the intercrop of squashes and potatoes, but the trees received considerable benefit therefrom.

During the past year, 1912, all trees, in this orchard have been labeled, the label giving row number, number of the tree in the row, and the name of the variety. The name will greatly assist visitors, while the tree number will facilitate the making of records.

The orchard was clean cultivated in 1911, except for squashes between the rows at the western end. In 1912 this same part is devoted to squashes, while the balance is interplanted with potatoes, leaving about six feet on each side of the tree rows free from crops. Each tree has received repeated individual hoeings, so as to keep the land free from weeds and conserve the soil mulch.

Individual detailed records for each tree, showing the character of the tree, quality and quantity of fruit are being made, giving some valuable data to the fruit growers of the state.

Variety Test of Plums.

The season of 1912 is the fifth season of growth for the variety plum orchard. This orchard now contains 201 trees, comprising 24 varieties, which represent the four most important groups of plums. Each tree has now been labeled with a wooden label attached to the tree, showing its individual orchard number and the name of the variety.

In 1911 clean culture throughout the season was given. The orchard was manured lightly during the winter of 1911 to 1912. Following this it was cultivated till midsummer and is now sown down to a fall cover crop of crimson clover.

A large number of records have been made relative to the growth, hardiness and productiveness. A large number of illustrative photographs are also on record. Beginning the season of 1912 the crop in quarts from each tree has been recorded.

The records so far show that the varieties Burbank, Red June, and Chabot are the most satisfactory croppers among the Japanese plums. Lombard among the European kinds has fruited well.

The Japanese variety Wickson which, where it can be grown is a fine market plum, with us has not proved sufficiently hardy; both its wood and fruit buds have winter killed. We would suggest that it be tried out in locations with more altitude and better air drainage, such as would be recommended for peaches.

It has been demonstrated that the variety Burbank is self-sterile, and that it is necessary to have some other free flowering variety, such as Red June, Chabot or Abundance, close to it in order that a first-class crop may be produced.

Variety Test of Small Fruits.

A number of varieties of currants, gooseberries, blackberries and raspberries have been set for determining the hardiness, prolificacy, and general market qualities of the varieties for the State. They have not come into bearing and consequently there is no report at this time.

Plant Breeding.

Work on the lines of carnation breeding have been suspended during the last two years; the writer has, however, been careful to propagate by cuttings the various hybrid carnations as mentioned in report of 1910. So the work may be continued and completed in 1912–13.

Tomato Culture Under Glass.

This work has been continued for the last two years with a view to ascertaining the most satisfactory and profitable varieties to raise under glass in New Hampshire. Varieties: Comet, Sutton A-1, the Rochford and Sutton Winter Beauty were the varieties grown the last season and seeds procured for further investigations for season 1913.

EXPERIMENTS UNDER ADAMS FUND.

Fruit Bud Formation Project.

The work under this project has been continued as reported in the last biennial report and a bulletin, No. 153, has been published in the meantime by Prof. B. S. Pickett. The same plan of the experiment continues, consisting in the comparison of various cultivation and fertilizer treatments in an orchard consisting of approximately 300 trees.

No results of marked value were reported previous to 1910, but since that time very marked differences have appeared in the various plots, amongst the most striking of which are the following:

The rate of wood growth in plots cultivated every other year was approximately double that of plots not cultivated, and in plots which were cultivated every year the rate of wood growth was about double that of plots cultivated every other year. The growing season has varied this to some extent. No marked difference was shown in rate of wood growth between plots cultivated but not fertilized, and plots which were both cultivated and fertilized. The total crop from this orchard for the season 1912 will be approximately 550

barrels, although the crop is not completely harvested at date of writing. Accurate accounts from each tree have been kept, giving yield, weight of apples per bushel, and grade of fruit, as previously.

Plant Breeding Projects.

The experiments in breeding of squashes and muskmelons have been continued and are practically finished. Complete sets of data have been obtained as results of these studies. Photographic records showing the various varying proportions in form and color throughout the succeeding generations of hybrids have been made.

REPORT OF WORK IN THE GREENHOUSES.

The work in this department has been conducted on a semi-commercial basis, *i. e.*, we have endeavored to do as much business as possible commercially in order that the greenhouses may be as nearly as possible self-supporting. We have not, however, overlooked the importance of the value of the greenhouses being used as part of our laboratory. No. 1 house has been utilized entirely as a laboratory in connection with our teaching work. No. 2 house we have used solely as a vegetable forcing house, the following crops being grown: lettuce, tomatoes, and cucumbers. We have conducted some work on the following lines of investigation: A variety test of lettuce under glass, also several crosses on tomatoes have been made, and the hybrids grown with a view to produce varieties which are in some measure improvements over the old ones.

No. 3 house has been used during the last two years exclusively by the Botanist. No. 4 house has been used as a lettuce house during the winter months, followed by cucumbers during the early spring, the cucumbers being followed by potted plants. The work and investigation now carried on with the cucumber (which is a hybrid bred by the Department of Horticulture, New Hampshire College) is to develop a better form in the fruit, particularly the shoulder which has a slight tendency to taper. No. 5 and No. 6 houses have been devoted to carnation growing and breeding work during the winter months, followed by melons which have been grown and many crosses made on which the studies in Inheritance of Characters are being made.

No. 7 or palm house is devoted entirely to palms, ferns and exotic plants, these plants being used for decoration at our social functions, and exhibited in various places as part of the College exhibit.

REPORT OF THE DEPARTMENT OF ANIMAL HUSBANDRY.

J. M. JONES.

The writer has recently been placed at the head of the Animal Husbandry Department, having taken up his work at this Station September 1, 1912, therefore this report must necessarily be brief. So far as I have been able to ascertain the department was left in commendable condition by Prof. T. R. Arkell, former Animal Husbandman.

The experimental work in this department is confined entirely to investigations in the breeding and feeding of sheep.

Sheep Breeding.

This project as orginally outlined was inaugurated primarily:

1. To determine the principles involved and the best methods to be employed in grading up a flock of sheep, particularly for early lamb production, studying the characters of crosses with reference to Mendel's law, and,

2. To determine the principles involved in fixing certain characters in sheep, studying the closeness with which the characters of the bybrids follow Mendels law, and their application to breeding problems. This project is still being conducted with the same ends in view, although several additional characters are being studied at this time which were not instigated at the time the experiment proper began, namely inheritance of horns, inheritance of wool and the inheritance of wrinkles.

This breeding project has been carried on as an Adams Fund Project in coöperation with Dr. C. B. Davenport, Station for Experimental Evolution, Carnegie Institution of Washington, Cold Spring Harbor, Long Island. The department is, indeed, fortunate in having the advice of Dr. Davenport upon the various questions and difficulties that arise during the the course of an investigation of this character as he is recognized the world over for his able work in genetics.

The only bulletin so far published relative to the breeding investigation is New Hampshire Bulletin No. 160, entitled, "Some data on the Inheritance of Horns in Sheep." Horns being a patent character to investigate.

Arkell and Davenport formulated the hypothesis that horns in sheep represented the typical sex-limited character. This was based on the assumption that there is an inhibitor to horn formation located on the sex chromosome. The hypothesis further assumes that the male (sheep) is heterozygous (simplex) in sex. One sex chromosome is expected in the male. The female is expected to be duplex in respect to sex. Consequently since the inhibitor is sex limited it will be simplex in the male and duplex in the female.

While this bulletin does not pretend to have definitely proven the inheritance of horns in sheep, nevertheless, much light is cast upon that phase of genetics. This bulletin is strictly a scientific treatise and, rather than attempting to elaborate in detail in such a short paper, it is urged that the parties especially

interested procure copies of this bulletin as it contains pictures and a large number of tables.

From the data gathered in this breeding experiment the investigators have, so far, been led to believe that the wrinkles or folds, which are so characteristic of the Merino, behave in a Mendelian fashion. So far, from the data collected this particular phase of the investigation offers some interesting data, and no doubt the next publication will most likely deal with these characters.

The following chart shows clearly the measurements that are being taken on all the sheep:

RECORD CHART.

Nose.			Neck.			Trunk.				Fore Leg	
Sagittal lgh. to Horn Ridge.	Transverse diam. Skull at Poll.	Ratio T D / S L	Length: Horn Rdg. to 1st Thor. Vert.	Cir. Mid. between Horn Ridge and 1st Thor. Vert.	Ratio L / C	Length: 1st Thor. Vert. to Tail Head.	Dorsal Ventral dia. behind Fore Legs.	Tran. diam. behind Fore Legs.	Ratio T D / D V D	Length.	Ratio Leg L / Trunk L

Hind Leg.		Leg Bones.											
Length.	Ratio Leg L / Trunk L	Fore		Ratio Ulna / K to F	Hind		Ratio Tibia / K to F	Width of Loin.	Length of Croup: Apex of Ilium to Tail Head	Ratio Loin / Croup	Hind Leg: Circum. as high as possible.	Ratio Tibia / Cir. H. Leg
		Ulna	Knee to Foot		Tibia	Knee to Foot						

Section of record chart, showing the system of taking and recording measurements.

After the records of enough of the F. + F_2 generations have been taken and recorded as shown above, any correlation may easily be detected.

In the fibre testing a sample of wool is taken from the shoulder of each of the sheep used in the experiment and several hundred of the fibres are tested, record being made of length of fibre, crimp length, elasticity and tensile strength of each separate wool fibre. These records should offer an opportunity for some interesting data, and some important facts may be revealed upon comparison of parent fibres with those of the F and F_2 generations. The diameter and weight of a number of the fibres is also calculated, and the percentage of yolk in the fleece is determined by scouring samples from each fleece.

The last report issued by this department inferred that some data on the breeding project would be published within the space of the next two years. Unfortunately, however, it happened that the majority of lambs of the F_2 generation in the spring of 1911 were males, and as a result, the mating of that generation *inter se* has been shifted back another year. There was a good crop of both male and female lambs last spring (1912), and they will be mated *inter se* during the next breeding season (1913), and it will not be until after the lambs resulting from these matings are dropped, that an explanation may be forthcoming, as to the fixation of any new characters that show in the F_2 generation.

This project is highly important, and requires that absolutely accurate data be kept on all the sheep. As the experiment grows older it is necessary that the flock also become larger, because when the F_2 generation is tested for the purity of certain visible characters, they can be more readily detected or proven by increased numbers. To illustrate clearly, it is true that with the F_2 generation of certain animals and plants which have been tested out, or experimented upon, that two individuals or more of the F_2 generation may reveal exactly the same characteristics to the eye, no external difference being detected, but upon mating, only certain combinations breed true to type. So in this breeding project, various combinations shall very probably have to be made, which will take several years.

It is hoped the general public realize, that such a problem of this character and scope, will possible take a long time to reach an ultimate solution. It becomes more complex as it grows, also more expensive, due to the increased size of the flock and the cost of maintaining it.

Breeding Multi-nippled Sheep.

This department continues to study the inheritance of multi-nipples in sheep, but owing to limited material with which to work the progress has necessarily been slow. As stated in the last biennial report Dr. Alexander Graham Bell and Dr. C. B. Davenport presented the Station with two multi-nippled sheep, one ram and a ewe, each possessing seven apparent nipples. They were mated but no lamb was dropped. The milti-nippled ewe recently met with accidental death.

Two years ago the ram was placed with a flock of about forty native two-nippled ewes, and as a result of this mating a number of lambs possessing more than two nipples were dropped, the most frequent number being four, only two of which were normally developed in any case. The multi-nippled sheep from the seven-nippled ram were mated *inter se* during the summer of 1911, but no lambs were dropped as a result of such matings. Similar matings are being made this fall and just what the result may be cannot be forecasted at this time. One of the get of the seven-nippled ram, a four-nippled specimen, has been placed with a flock of about 30 native ewes on a farm near this Station and it is expected that this will aid greatly in securing data.

This line of investigation is of economic importance. The average sheep breeder well knows that the ordinary two-nippled ewe cannot properly nourish a pair of twins, and if it can be authentically proven that a multi-nippled ewe

furnishes more milk than the ordinary two-nippled ewe and the mode of transmission of the nipples determined a great step will have been taken towards the goal of advancement in the sheep industry.

Inheritance of Twins.

During the past two years the Animal Husbandman spent some little time in studying the inheritance of twins in sheep. Circular letters were sent to many of the noted sheep breeders, asking them to coöperate in this work. The following form was used:

NEW HAMPSHIRE EXPERIMENT STATION.

Record of Offspring.

Breed:

Ancestry Sire	Ancestry Dam	Offspring 1912	Offspring 1913	Offspring 1914
Twin or Single	Twin or Single	Twins or Single	Twins or Single	Twins or Single

A number of the breeders responded generously but it was finally decided that the data was not absolutely reliable as in numerous instances the breeders had not kept records of the parent stock and consequently did not know whether or not they were twin or single stock. On that account it was decided to drop that particular phase of the investigation. However, a record of twins and their ancestry is kept of the Station flock and as thorough a study as possible shall be made.

Inheritance of Wool Color.

The department is now in possession of two black sheep, one pure bred Hampshire ram, of a dark grayish color, and a black Oxford ewe. These two were mated last fall (1911), but no lamb was dropped. The ram was also mated with several white fleeced ewes, but in all the cases the black behaved as a recessive in the F_1 generation.

This investigation will be continued and as thorough a study as possible will be made on the color inheritance of the wool fibre as this is a problem of economic significance, owing to the fact that black wool brings from two to five cents, less per pound, on the market than the ordinary white. Black wool is much more deceptive to the buyer than the lighter colored wools owing to the difficulty experienced estimating the amount of yolk and dirt present in the fleece.

Sheep Feeding.

The sheep feeding experiments comparing:

a. Clover Hay with New Hampshire Hay, and

b. Turnips *vs.* a Dry Ration, were completed nearly two years ago and a bulletin was published in January, 1911, entitled "Feeding Sheep and Lambs"; "Clover Hay *vs.* Native Hay"; "Turnips *vs.* Dry Ration."

The results of this experiment proved the utter superiority of clover hay over the native hay as a feed for sheep. In this treatise the author advocates the

selling of the native hay in instances where the farmer has a flock of sheep to winter, and in place thereof advises the purchase of alfalfa or clover hay, even though the purchase be made at a higher cost per ton. As a much more economical gain will be made in the end. Roots were strongly recommended as they give a laxative tone to the ration.

In comparing Turnips *vs.* a Dry Ration for lambs, it was found that in every instance the lambs on the turnip ration made decidedly better gains than those on a dry ration. The experiment proved that roots reduce the cost of mutton production, and aid wonderfully in keeping the sheep in a healthy condition.

Tobacco Feeding for the Eradication of the Stomach Worm in Sheep (*Haemonchus Contortus*).

Although no publication was issued on this experiment during the year and one half in which it was conducted, the following report of progress to the Director of the Experiment Station was issued by the Animal Husbandman:

"Tobacco was first fed to a few sheep to discover in what condition they preferred it. It was given in the form of dust, the stems and midribs cut, and uncut, the former fed dry mixed with salt, and the latter soaked in salty water. At times they would eat greedily of it and would scarcely touch salt without the tobacco. A few slight cases of scouring occurred which may have been due to the tobacco, but they were not severe, were readily checked and did not cause serious setback to the affected sheep.

"Three lots of sheep were selected for the experiment, ten in each lot. One lot was composed of sheep that were assuredly recognized to be infected with worms; the other two lots, of apparently healthy lambs placed, however, upon infected pasture. Tobacco has been kept constantly for sixteen months before the infected sheep and one lot of healthy lambs. The other lot of healthy lambs received no tobacco. Four of the infected sheep during that time have died, two others are sickly, but the other four have become strong, vigorous and fat. As sickly as the others at the beginning, they have apparently recovered. The four that died were strongly infested with the stomach worm. The lot of healthy lambs receiving tobacco, are, at the present writing, all alive, although three show signs of sickliness. The others are in a thriving condition and fat. Two of the lambs in the other lot getting no tobacco are dead due to stomach worm and three others are visibly sick. The feed and management was as nearly as possible similar in both instances. Therefore, up to date, tobacco feeding seems to have been productive of some good effects in restraining the ravages of the stomach worm. However, no conclusive results can yet be drawn and several more years of experimentation with many sheep will still be necessary."

Since the foregoing report of progress was issued by Professor Arkell, this special investigation has continually been underway. The department feels that the solution of such a problem as that of stomach worms in sheep is one of utmost importance and, since reliable vermifuges for sheep are not common, it seems advisable to continue the tobacco feeding experiment in further

anticipation of favorable results. There are none of the station sheep noticeably affected with stomach worms at the present time; however, tobacco that has been soaked in a strong salt solution is kept before them at all times as a preventive measure. They seem to be very fond of the salted leaves and greatly enjoy nibbling away at them.

If it can be satisfactorily shown that tobacco acts as a preventive of worms in sheep it will mean a great deal to the industry, as a preventive is always better than a cure. Since ample funds are not available to carry on this work on an extensive scale, it might be brought to a termination much sooner if some of the sheepmen in the vicinity of the Station would coöperate in this work, that is, for example, loan a few worm infected sheep to the Station for experimental purposes.

REPORT OF THE DEPARTMENT OF ENTOMOLOGY.

W. C. O'KANE.

As in former years the work of this department, for the period ending October 30, 1912, falls into three general groups.

First, *Adams Fund Investigations*, which are designed to be exhaustive in their nature and to continue throughout a period of years. One of these studies, which is concerned with the apple maggot or railroad worm, has been practically completed with the close of the present season. This has been in progress for somewhat more than three years. A second investigation, concerned with the control of the root maggots, is now under way, having been started about a year ago. Several years will be required for this investigation.

Second, *Minor Investigations* conducted under Hatch Funds. Three groups of experiments have been in progress during the past season. One of these is concerned with the life history and control of black flies, deer flies and midges. This has been under way for several years. A second investigation was undertaken to determine the amount of arsenic left on fruit, foliage and grass in ordinary spraying operations. This is now actively under consideration. A third investigation is concerned with insect outbreaks and has taken up two interesting questions, as described later.

Third, *Miscellaneous Work*, supported by Hatch Funds; including the preparation and maintainance of the Station collection of insects, the answering of voluminous correspondence, and the preparation and maintainance of a complete cross-index file of injurious insects of New Hampshire, with their food plants and localities.

Organization and Equipment.

The Assistant Entomologist, Miss Cornelia F. Kephart, resigned on September 1, 1912, after twelve years of faithful service, and was succeeded by Mr.

C. H. Hadley, Jr., a graduate of New Hampshire College, of the class of 1912, and a specialist in Economic Entomology.

The equipment, as regards working collection of injurious insects of New Hampshire, has been increased several fold in the past two years. This collection has now been made available for daily work by proper mounting and is one of the most complete and valuable in the country.

Additions to equipment of spray appliances have been found advisable in order to handle the investigations undertaken to determine the arsenic remaining on fruit foliage and grass.

Special equipment has been devised for use in the project concerning the control of root maggots, and further equipment will be necessary along this same line.

Correspondence.

All inquiries concerning insects are now carried under the following separate indices: first, name of the correspondent; second, locality where the insect is found; third, food plant on which the insect was observed at work; and fourth, name of the insect itself.

In the handling of the large amount of correspondence of this department the series of printed circulars issued the past two years have been of great value. More are needed.

Publications of the Department.

The following Stations publications have been issued from this department since the last report:

Circular No. 14, "The Apple Maggot or Railroad Worm," by W. C. O'Kane, June, 1911.

Press Bulletin No. 4, "Weevils in Beans," by W. C. O'Kane, November 1, 1911.

Press Bulletin No. 13, "Control of San José Scale and the Blister Mite," by W. C. O'Kane, February 1, 1912.

Other publications by the Entomologist are as follows:

Circular No. 1, of the State Moth Department, "The Gypsy Moth."

Circular No. 2, of the State Moth Department, "The Browntail Moth."

Circular No. 3, of the State Moth Department, "Control of the Gypsy Moth in Woodlands and Orchards."

Circular No. 4, of the State Moth Department, "Public Measures Against the Gypsy and the Browntail Moths."

"Methods in Insect Photography," Journal of Economic Entomology, Volume 5, No. 1, February, 1912.

In addition the Entomologist has contributed articles to agricultural publications.

INVESTIGATION UNDER ADAMS FUNDS.

The Apple Maggot.

As stated elsewhere, this work is now practically complete. Details in the life history of this insect have been worked out with sufficient data to render the results trustworthy. An effective and economic means of con-

trol was determined and this was at once made available for the fruit growers of the State by the issuance of circular No. 14.

The detailed report of the results of this investigation will be ready for publication this winter, as a bulletin of this Station. The various projects that have been carried through include: the extent of infestation by the apple maggot in the State; the susceptibility of various varities of apples; the deterioration of infested fruit in storage as compared with uninfested fruits; the accurate life history of the species; the habits of the species; the possible means of control.

It will be desirable to continue work on this insect in a minor way next season, in order to verify certain facts and to clear up two or three points that have been difficult or impossible to determine. These points do not vitally effect the entire work but they should be completed. They include further experiments to determine the average distance to which the adult flies will travel, under natural conditions, the percentage of adults that emerge the second season, instead of the first, following the pupal stage; further tests with live stock, especially pigs and poultry.

The above matters were under consideration this season, but were impossible of definite conclusions, because of an unusual lack of abundance of the pest.

Control of Root Maggots.

All of the work done so far under this project is preliminary in its nature It is necessary, first, to overcome the technical and mechanical difficulties in the way of favorable investigations, and these have not yet been satisfactorily solved, although solution appears to be nearer. No results are yet ready for publication under this project.

The fundamental aim of the project is to determine the basic rules for the use of insecticides beneath the surface of the ground that will kill root maggots, including such points as: the extent and rate of diffusion of poisonous gases; the effective zone of poisonous liquids; the effects of various chemicals under each of the above classes on animal life; the effects of the same on vegetable life; and other similar questions.

Work on this project will constitute the major part of the investigations of the coming winter.

INVESTIGATIONS UNDER HATCH FUNDS.

The Control of Black Flies.

For two successive seasons extensive field experiments have been under way at Dixville Notch, New Hampshire. In each of these two seasons an entire section, including about eight square miles, has been treated for black flies.

Unexpected new facts were discovered in the life history of this pest, as regards, at least, one of the species concerned. While these new facts do not have a direct bearing on the manner of treatment of the pest, they immediately concern the program or schedule of treatment.

The facts discovered are of such a nature that only extended field observations for another season or two can determine accurately the precise variation in the life history. These observations are now in progress and further work next season will be planned in accordance with the new data.

Arsenic on Fruit.

As a result of the prevalence of the browntail moth in New Hampshire, this department, with other entomologists in other states of New England, has repeatedly found occasion to advise fruit growers to spray fruit trees in August. This plan is, by all means, the most effective one for control of the above insect. The question then arose as to the danger of poisoning human beings through arsenate of lead adhering to the surface of ripe or nearly ripe fruit. A related question concerned with the possible poisoning of live stock allowed to graze beneath heavily sprayed trees.

In the lack of accurate and sufficient data on this important subject, investigations were undertaken to provide definite information. Trees have been sprayed with known amounts of material under various conditions and the fruit picked at varying intervals. Through the Department of Chemistry of this Station, determinations are now being made of the amount of arsenic oxide remaining on the surface of fruit, foliage and grass. The results will be ready for publication this winter.

Insect Outbreaks.

Early this year the department learned of an occurrence of chinch bugs in large numbers in a section in the western part of New Hampshire. An assistant was sent to investigate the outbreak and further studies were conducted this fall. The occurrence of this insect in destructive numbers in this locality is unusual.

A remarkable occurrence of a peculiar, obnoxious beetle was reported by one of the large summer hotels in the White Mountains and the circumstances were sufficiently interesting and important to warrant investigation. Apparently the only other recorded instance of a similar outbreak was in California some forty years ago. This insect will be given further study.

Tests of Insecticides on Sucking Insects.

In connection with tests of chemicals on soil-inhabiting insects it is found desirable to try the effect of promising materials on aerial insects that are resistant to known materials of control.

REPORT OF DEPARTMENT OF FORESTRY.

J. H. FOSTER.

The Department of Forestry at New Hampshire College was established September 1, 1911. The appropriation by the Legislature for this department for the two ensuing years was $7,000. The department afterwards became a part of the Experiment Station and has taken part in the correspondence and extension work during the past year.

All expenses of establishing the department and of maintaining it until July 1, 1913, are paid from the state appropriation. No Experiment Station funds have been used during the past year, and the work of the department has necessarily at first been largely confined to the development of forestry teaching at the college. For the fiscal year beginning July 1, 1912, an allotment of $100 was made from the Hatch Fund for experimental work in forestry and this will be used during the present year.

Experiments in the raising and planting of forest tree seedlings were begun last spring. The object of such experiments is to determine what species of trees either native or introduced are most adaptable to New Hampshire conditions; to determine the cost of raising the seedlings in nursery beds and the cheapest and most satisfactory methods of reproduction of these species in the field by transplanting the nursery stock and by various methods of direct seeding; also to study the growth and yield of second growth woodlots of important economic species.

The work was begun by planting the seed of white pine, western yellow pine, Scotch pine, Douglas fir, European larch, long leaf pine, Norway spruce, white spruce, Arizona cypress, catalpa, black locust, honey locust, red oak, and black walnut in prepared beds and by planting 5,000 two-year-old seedlings of white pine, European larch, Douglas fir, and Norway spruce in nursery rows for larger stock to plant out another year. The seed planted in beds is now one year old and will remain in the beds another year. The two-year seedlings are now three years old and most of them will be planted out next spring. Next spring additional beds will be started and experiments in planting out will be definitely begun.

The results of the nursery work are extremely favorable for Douglas fir, European larch, white pine, Norway spruce and Scotch pine. Douglas fir, Scotch pine and European larch appear to be more vigorous and more easily raised from seed than any of the other species used this year. It will be interesting to note the condition of their growth as compared with white pine, Norway spruce, and other commonly planted trees when permanently established in the field.

The only field planting carried on last spring was in Davis Park in Lee where 500 three-year-old white pine transplants, 100 two-year-old black locust, 100 Russian mulberry, and 100 American linden seedlings were set out in rows six by six feet. The results on this thin, rocky soil were not satisfactory owing to an extremely dry period of six weeks following the planting and to the fact that cattle have done some damage by trampling and brows-

ing. If the grazing can be stopped, experiments in fall planting of European larch and Douglas fir will be tried this fall in Davis Park.

Another line of experimental work which will be started this year is the study of growth and yield of woodlots of quick growing and economic species, particularly pure stands of second growth white pine on different types of soil. This will be done by locating permanent sample plots of known size, two together in each of the different conditions to be studied. These plots will be marked by substantial corners. The amount of timber in cords or board feet on each plot will be determined with great accuracy. One of the two plots of each kind will be given such thinning or other treatment as seems desirable in order to increase the yield and improve the condition while the other is maintained in natural condition. Measurements will be taken each year and the yields recorded together with all data such as amount of material removed in thinnings, etc. After a few years the comparison of yields from the paired plots will give figures of much value to foresters and owners of woodlots. After plantations of other economic trees have been established permanent sample plots will be located in these also.

Consultation with owners of woodlots and plantations of trees have been made throughout the year and many tracts have been personally examined. Because of the amount of time required in making these examinations, this work cannot be greatly extended as a part of the Experiment Station work until assistance in teaching is available. Eventually it would be desirable to have much more of this extension and demonstration work handled from the Station.

There is great need in the State for published information on the treatment and management of New Hampshire woodlots. It is desired to publish an extension bulletin on this subject this year.

REPORT OF THE EXPERIMENT STATION LIBRARY.

MABEL HODGKINS.

The Library is still administered as a department of the College library for the ordering, accessioning and cataloging of books; and, in addition, half the time of one assistant is given to filing bulletins, checking periodicals received and general work with the collections. Loose-leaf binders are being used instead of pamphlet boxes for holding station bulletins in good order until the volumes are ready for binding; and we hope very soon to get a fairly complete set of Department of Agriculture publications bound for permanent preservation.

EXPERIMENT STATION LIBRARY, 1910–1912.

	1910–11	1911–12		
Added by purchase	10	20	$40	$93
gift or exchange	38	44	20	20
binding	7	148	31	496
	55	212	91	609
Total added	267			$700
Latest accession number	2,838			
Less books withdrawn (worn out, etc.)	5			
books missing, June, 1912	13			
Actual number	2,820			
Pamphlets (estimated)	2,000			
Volumes in Library June 30, 1910	2,571			$6,401
Volumes in Library June 30, 1912	2,820			$7,101
Value of library			$7,000.00	
Furniture and fixtures:				
2 stacks	$150			
2 catalogue cases	50		200.00	
Catalogue			30.00	
Pamphlet boxes, binders, etc.			120.00	
Supplies			5.00	
				$7,355.00

PUBLICATIONS OF THE NEW HAMPSHIRE AGRICULTURAL EXPERIMENT STATION.

1888–1912.

Bulletin. BULLETINS.

No. *1. Ensilage. Whitcher, G. H. April, 1888. 16p.
No. 2. Feeding Experiments. Whitcher, G. H. June, 1888. 14p.
No. *3. When to Cut Corn Ensilage. Whitcher, G. H. July, 1888. 9p.
No. *4. The Science and Practice of Stock Feeding. Whitcher, G. H. November, 1888. 31p.
No. 5. Fertilizers and Fertilizing Materials. Whitcher, G. H. March, 1889. 18p.
No. 6. Experiments with Fertilizers. Whitcher, G. H. April, 1889. 32p.
No. *7. Tests of Dairy Apparatus. Whitcher, G. H. March, 1889. 16p.
No. *8. Feeding Experiments. Whitcher, G. H. November, 1889. 17p.
No. *9. Effect of Food upon Milk. Whitcher, G. H. February, 1890. 16p.
No. *10. Coöperative Fertilizer Experiments. Whitcher, G. H. March, 1890. 16p.
No. *11. Pig-Feeding Experiments. Whitcher, G. H. November, 1890. 14p.
No. 12. Fertilizer Experiments. Whitcher, G. H. March, 1891. 13p.
No. *13. Effect of Food on Butter. Wood, A. H., and Parsons, C. L. May, 1891. 11p.
No. 14. Ensilage in Dairy Garming. Whitcher, G. H. May, 1891. 8p.
No. *15. Patent Cattle-Foods. Whitcher, G. H., and Morse, F. W. December, 1891. 7p.
No. 16 Effect of Food on Composition of Butter Fat. Morse, F. W. September, 1892. 20p.
No. *17. Stock Feeders' Guide. Whitcher, G. H. October, 1892. 13p.
No. *18. Effect of Food on Milk. Wood, A. H. November, 1892. 16p.
No. 19. Spraying Apples and Pears against Fungi. Lamson, H. H. February, 1894. 13p.
No. 20. Effect of Food on Milk. Wood, A. H. March, 1894. 8p.
No. 21. Farm Yard Manures and Artificial Fertilizers. Whitcher, G. H. April, 1894. 16p.
No. 22. Prevention of Potato Blight. Lamson, H. H. May, 1894. 8p.
No. *23. Some Cangerous Fruit Insects. Weed, C. M. November, 1894. 22p.

*Out of print.

Bulletins.

Bulletin.

No. *24. Flow of Maple Sap. Wood, A. H. February, 1895. 9p.
No. *25. The Composition of Maple Sap. Morse, F. W., and Wood, A. H. March, 1896. 13p.
No. 26. Analysis of Fertilizers and Wood Ashes. Morse, F. W. March, 1895. 10p.
No. *27. Spraying Experiments in 1894. Lamson, H. H. April, 1895. 16p.
No. *28. Remedies for the Horn Fly. Weed, C. M. June, 1895. 4p.
No. *29. Remedies for the Flea Beetle. Weed, C. M. June, 1895. 7p.
No. *30. An Experiment in Road Making. Pettee, C. H. July, 1895. 19p.
No. 31. Seventh Annual Report. Murkland, Charles S. November, 1895. 24p.
No. *32. Studies of Maple Sap. Morse, F. W. September, 1895. 16p.
No. *33. Two Shade Tree Pests. Weed, C. M. November, 1895. 9p.
No. *34. Surface and Sub-Irrigation Out-of-Doors. Rane, F. W. August, 1896. 27p.
No. *35. The Codling Moth and Apple Maggot. Weed, C. M. May, 1896. 6p.
No. *36. Analysis of Three Common Insecticides. Morse, F. W. June, 1896. 4p.
No. *37. Crimson Clover. Rane, F. W. July, 1896. 4p.
No. *38. The Tent Caterpillar. Weed, C. M. August, 1896. 15p.
No. *39. The Army Worm. Weed, C. M. September, 1896. 13p.
No. 40. Eighth Annual Report. Murkland, C. S. November, 1896. 16p.
No. *41. Potatoes; Varieties, Fertilizers and Scab. Rane, F. W., and Hunt, Leigh. February, 1897. 10p.
No. *42. Tomato Growing in New Hampshire. Rane, F. W., and Hunt, Leigh. January, 1897. 10p.
No. *43. Some Inferior Wood Ashes. Morse, F. W. February, 1897. 5p.
No. *44. The Canker Worm. Weed, C. M. April, 1897. 10p.
No. *45. Fruit and Potato Diseases. Lamson, H. H. May, 1897. 11p.
No. *46. Experiments with a Steam Drill and Methods of Road Maintenance. August, 1897. 29p.
No. *47. Strawberries in New Hampshire. Rane, F. W. October, 1897. 26p.
No. *48. Ninth Annual Report. Murkland, C. S. November, 1897. 30p.
No. *49. The Inspection of Fertilizers in 1897. Morse, F. W. January, 1898. 18p.
No. *50. Dehorning Cattle. Lamson, H. H., and Rane, F. W. February, 1898. 9p.
No. *51. Sweet Corn in New Hampshire. Rane, F. W. March, 1898. 15p.
No. *52. Growing Muskmelons in the North. Rane, F. W. April, 1898. 24p.
No. *53. The Farm Water Supply. Morse, F. W. May, 1888. 11p.
No. *54. The Winter Food of the Chickadee. Weed, C. M. June, 1898. 15p.
No. *55. The Feeding Habits of the Chipping Sparrow. Weed, C. M. July, 1898. 10p.
No. *56. Poisonous Properties of Wild Cherry Leaves. Howard, C. D., and Morse, F. W. August, 1898. 10p.
No. *57. Experiments with Roots and Forage Crops. Rane, F. W. September, 1898. 28p.
No. *58. Cost of Raising Calves. Morse, F. W. October, 1898. 8p.
No. *59. Tenth Annual Report. Murkland, C. S. November, 1898. 53p.
No. *60. Green Corn under Glass. Rane, F. W. January, 1899. 16p.
No. *61. Inspection of Fertilizers in 1898. Morse, F. W. February, 1899. 11p.
No. *62. Forcing Pole Beans under Glass. Rane, F. W. February, 1899. 7p.
No. *63. Third Potato Report. Rane, F. W. March, 1899. 37p.
No. 64. Forest Tent Caterpillar. Weed, C. M. April, 1899. 22p.
No. *65. Notes on Apple and Potato Diseases. Lamson, H. H. May, 1899. 10p.
No. *66. Experiments in Pig Feeding. Burkett, Charles W. September, 1899. 15p.
No. 67. Spiny Elm Caterpillar. Weed, C. M. October, 1899. 15p. il.
No. *68. Eleventh Annual Report. Murkland, C. S. November, 1899. 49p.
No. 69. Inspection of Fertilizers, in 1899 in Coöperation with the State Board of Agriculture. Morse, F. W. January, 1900. 14p.
No. *70. Experiments with Muskmelons. Rane, F. W. January, 1900. 27p.
No. *71. Corn Culture. Burkett, C. W. February, 1900. 12p.
No. *72. Insect Record for 1899. Weed, C. M. February, 1900. 14p.
No. *73. Experiments with Tomatoes and Potatoes. Rane, F. W. March, 1900. 11p.
No. *74. Growing Strawberries in New Hampshire. Rane, F. W. April, 1900. 20p.
No. *75. The Forest Tent Caterpillar. Weed, C. M. May, 1900. 26p.
No. *76. Utilizing the Greenhouse in Summer. Rane, F. W. June, 1900. 10p.
No. 77. Experiments in Road Surfacing. Pettee, C. H. September, 1900. 15p.
No. 78. Bovine Tuberculosis. Lamson, H. H. October, 1900. 17p.
No. *79. Twelfth Annual Report. Murkland, C. S. Nov. 1900. 38p.
No. *80. Inspection of Fertilizers in 1900. Morse, F. W. January, 1901. 8p.
No. *81. Insect Record for 1900. Weed, C. M. February, 1901. 12p.
No. *82. Feeding Farm Horses. Burkett, C. W. July, 1901. 25p.
No. *83. The Value of Meadow Muck. Morse, F. W. August, 1901. 4p.
No. *84. Forcing Dwarf Tomatoes under Glass. Rane, F. W. September, 1901. 10p.
No. *85. Remedies for the Canker-Worm. Weed, C. M. October, 1901. 10p.
No. 86. Growing Watermelons in the North and Classification of Watermelons. Rane, F. W. November, 1901. 30p.
No. 87. Thirteenth Annual Report. Murkland, C. S. November, 1901. 25p.
No. *88. Inspection of Fertilizers in 1901. Morse, F. W. January, 1902. 11p.
No. *89. The Squash Bug. Conradi, A. F., and Weed, C. M. February, 1902. 15p.
No. *90. Insect Record for 1901. Weed, C. M. March, 1902. 16p.
No. *91. Killing Woodchucks with Carbon Bisulphide. Weed, C. M. May, 1902. 4p.
No. 92. Silage Studies. Morse, F. W. September, 1902. 14p.
No. *93. The Cold Storage of Apples. Morse, F. W., and others. October, 1902. 25p.
No. *94. Remedies for Fleas. Conradi, A. F. October, 1902. 4p.
No. 95. How to Grow a Forest from Seed. Rane, F. W. November, 1902. 14p.

*Out of print.

No. 96. Fourteenth Annual Report. Murkland, C. S. November, 1902. 31p.
No. *97. Inspection of Fertilizers in 1902. Morse, F. W. January, 1903. 12p.
No. *98. The Inspections of Feeding Stuffs for 1902. Morse, F. W. February, 1903. 23p.
No. *99. A Selected List of Vegetables from the Garden. Rane, F. W. March, 1903. 18p.
No. *100. White Fly of Greenhouse. Conradi, A. F., and Weed, C. H. March, 1903. 8p.
No. *101. Fungous Diseases and Spraying. Lamson, H. H. April, 1903. 12p.
No. 102. Insect Record for 1902. Weed, C. M. May, 1903. 10p.
No. 103. Standard Milk. Morse, F. W. October, 1903. 4p.
No. 104. Fifteenth Annual Report. November, 1903. 15p.
No. *105. Fruit Growing with a Selected list of Varieties. Rane, F. W. January, 1904. 24p.
No. *106. Forestry. Rane, F. W. February, 1904. 16p.
No. *107. Brown-Tail Moth in New Hampshire. Weed, C. M. February, 1904. 15p.
No. 108. Inspection of Fertilizers in 1903. Morse, F. W. March, 1904. 10p.
No. 109. The Pernicious or San José Scale Insect in New Hampshire. Weed, F. M. March, 1904. 10p.
No. *110. Experiment in Orchard Management in New England. Rane, F. W. March, 1904. 21p
No. 111. Ten Experiments with Potatoes and Potato Culture. Rane, F. W., and Hall, H. F. April, 1904. 23p.
No. 112. Experiments in Destroying Black-Flies. Weed, C. M. May, 1904. 8p.
No. *113. Corn Meal Middlings and Separator Skim-Milk for Fattening Pigs. October, 1904. 7p.
No. *114. Babcock Test for New Hampshire Farmers. Weld, I. C. November, 1904. 13p.
No. *115. Sixteenth Annual Report. December, 1904. 19p.
No. *116. The Inspection of Feeding Stuffs. Morse, F. W. January, 1905. 8p.
No. *117. Inspection of Fertilizers in 1904. Morse, F. W. January, 1905. 8p.
No. 118. Tile Drainage. Taylor, F. W. March, 1905. 32p.
No. 119. Forestry, Rane, F. W. March, 1905. 20p.
No. 120. Dairy Industry in New Hampshire. Weld, I. C. September, 1905. 10p.
No, *121. Gypsy Moth. Sanderson, E. D. December, 1905. 22p.
No. *122. Brown-Tail Moth in New Hampshire. Sanderson, E. D. February, 1906. 28p.
No. *123. Inspection of Fertilizers in 1905. Morse, F. W. February, 1906. 8p.
No. *124. Inspection of Feeding Stuffs in 1905. Morse, F. W. March, 1906. 8p.
No. 125. Vegetable Novelties. Rane, F. W., and Hall, H. F. March, 1906. 28p.
No. 126. The Care of Composite Milk Samples. Weld, I. C. April, 1905. 4p.
No. 127. The Feeding of Farm Stock. Taylor, F. W. September, 1906. 24p.
No. *128. Brown-Tail and Gypsy Moth. Sanderson, E. D., and Howard, L. O. January, 1907. 22p.
No. *129. The Seventeenth and Eighteenth Annual Reports. January, 1907. 44p.
No. *130. Inspection of Fertilizers. Morse, F. W. February, 1907. 8p.
No. *131. Spraying the Apple Orchard. Sanderson, E. D., and others. April, 1907. 48p.
No. 132. A Plan ro Improving the Quality of Milk and Cream Furnished to New Hampshire Creameries. Weld, I. C. May, 1907. 11p.
No. 133. Inspection of Feeding Stuffs in 1907. Morse, F. W. November, 1907. 8p.
No. *134. Fertilizer Analyses, 1907. Morse, F. W., and Curry, Bert E. December, 1907. 8p.
No. 135. The Respiration of Apples and Its Relation to Their Keeping. Morse, F. W., February, 1908. 8p.
No. 136. Gypsy and Brown-Tail Moths. Sanderson, E. D. February, 1908. 63p.
No. 137. Strawberries for New Hampshire. Hall, H. F. May, 1908. 36p.
No. 138. Humus in New Hampshire Soils. Morse, F. W. June, 1908. 13p.
No. 139. Caterpillars Injuring Apple Foliage in Late Summer. Sanderson, E. D. July, 1908. 22p.
No. 140. Analyses of Feeding Stuffs and Fertilizers. Morse, F. W., and Curry, B. E. December, 1908. 16p.
No. 141. A Study of Farm Butter-Making in New Hampshire. Rasmussen, Fred. September, 1909. 36p.
No. *142. The Availability of Soil Potash in Clay and Clay Loam Soils. Morse, F. W., and Curry, B. E. December, 1909. 22p.
No. *143. The Codling Moth and How to Control It by Spraying. Sanderson, E. D. December, 1909. 48p.
No. *144. Some Apple Diseases. Brooks, Charles. December, 1909. 32p.
No. 145. Variety Tests of Oats, Barley, Wheat and Rye. Taylor, F. W. December, 1909. 16p.
No. *146. Analyses of Fertilizers. Curry, B. E. December, 1909. 12p.
No. *147. Analyses of Feeding Stuffs. Morse, F. W., and Curry, B. E. December, 1909. 20p.
No. 148. Results of Seed Tests for 1910. Taylor, F. W. September, 1910. 24p.
No. 149. Results of the Feed Inspection for 1910. Curry, B. E., and Smith, T. O. October, 1910. 12p.
No. 150. Analyses of Fertilizers.
No. *151 Twenty-first and Twenty-second Report. 1909–1910.
No. 152. Feeding Sheep and Lambs: Clover Hay v. Native Hay; Turnips v. Dry Ration.
No. 153. Fruit Bud Formation.
No. 154. Feeding Stuffs Inspection. (1911).
No. 155. Fertilizer Inspection. (1911).
No. 156. Results of Seed Tests.
No. 157. Some Apple Diseases and Their Treatment.
No. 158. The Feed Stuffs Inspection. (1912).
No. 159. Fertilizers for Carnations.
No. 160. Some Data on Inheritance of Horns in Sheep.
No. 161. Fungicides in the Apple Orchard.
No. 162. Fertilizer Inspection. (1912).
No. 163. Twenty-third and Twenty-fourth Reports. 1911–1912.
No. 164. Results of Seed Tests for 1912.
No. 165. The Feeding Stuffs Inspection for 1913.

*Out of print.

Annual Reports.

†First Annual Report 1889. In the Eighteenth Report of the Board of Trustees of the New Hampshire College of Agriculture and Mechanic Arts. 1889. 99p.

†Second Annual Report 1890. In the Nineteenth Report of the Board of Trustees of the New Hampshire College of Agriculture and Mechanic Arts. 1890. p. 77–122.

Third and Fourth Annual Reports 1891–1892. In the Twentieth Report of Board of Trustees of the New Hampshire College of Agriculture and Mechanic Arts. 1893. p. 137–287.

Fifth Annual Report 1893. In the Twenty-first Report of the Board of Trustees of New Hampshire College of Agriculture and Mechanic Arts. 1893. p. 85–241.

Sixth Annual Report 1894. In the Twenty-second Report of the Board of Trustees of New Hampshire College of Agriculture and Mechanic Arts. 1894. p. 118–173.

All subsequent reports of the Station appear as bulletins. See Bulletin list.

Nineteenth and Twentieth Reports. In the Twenty-ninth Report of the Board of Trustees of New Hampshire College of Agriculture and Mechanic Arts. 1908. p. 246–680.

Technical Bulletins.

No. *1. An Annotated Catalogue of the Butterflies of New Hampshire. Fiske, W. F. 1901. 80p.
No. *2. Classification of American Muskmelons. Rane, F. W. March, 1901. 32p.
No. *3. Food of the Myrtle Warbler. Weed, C. M., and Dearborn, Ned. November, 1901. 32p.
No. *4. Effect of Acetylene Gas-Light on Plant Growth. Rane, F. W. October, 1902.
No. *5. A Partial Bibliography of the Economic Relations of the North American Birds. Weed, C. M. 41p.
No. *6. A Study of the Parasites of the American Tent Caterpillar. Fiske, W. F. 1903. 58p.

Nature Study Leaflets.

No. 1. Pollination of Flowers. Weed, C. M. 1902. 12p.
No. 2. Mission of the Birds. Weed, C. M. 1902. 8p.
No. 3. Plant Travelers. Weed, C. M. 1902. 8p.
No. *4. New Hampshire Wild Flowers. Weed, C. M. 1903. 16p.

School Bulletins.

No. 1. Agricultural Education through Rural Schools. Sanderson, E. D. 1908. 20p.
No. 2. Soil Studies. Taylor, F. W. 1908. 22p.
No. 3. Seeds and Seedlings. Brooks, C. 1908. 14p.

Circulars.

No. *1. Mixing Chemical Fertilizers on the Farm. Morse, F. W. 1908. 4p.
No. *2. Testing Soils for Fertilizer Needs. Taylor, F. W. 1908.
No. *3. The Apple Leaf-Aphis. Sanderson, E. D. 1908. 6p.
No. *4. Oyster-Shell Scale. 1908. 4p.
No. *5. San José Scale. Sanderson, E. D. 1908. 12p.
No. 6. A Circular of Information Concerning the New Hampshire Agricultural Experiment Station. 1908. 16p.
No. *7. Some Essentials in Farm Butter-Making. Rasmussen, F. 1908. 2p.
No. *8. The Box Pack for Apples. Wicks, W. H. September, 1909. 8p.
No. *9. Alfalfa in New Hampshire. Taylor, F. W. June, 1910. 4p.
No. 10. Breeding and Selection of Corn. Taylor, F. W. October, 1910. 8p.
No. 11. Horticultural Information and How to Obtain It.
No. 12. The Purchase and Home Mixing of Fertilizers.
No. 13. A Few Notes on Lime for Agricultural Purposes.
No. 14. The Apple Maggot or "Railroad Worm."

Scientific Contributions.

No. 5. Apple Fruit Spot and Quince Blotch.
No. 6. Apple Leaf Spot.

*Out of print.
†Also published separately.

METEOROLOGICAL RECORD

JULY 1, 1910, TO JUNE 30, 1912

DURHAM, N. H.

LATITUDE, 43° 8′ N
LONGITUDE, 70° 56′ W
ELEVATION ABOVE THE SEA, 88 FEET

Meteorological Record: Month of July, 1910.

July, 1910.	Temperature. Maximum.	Minimum.	Range.	* Set maximum.	Precipitation. † Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.	Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena.
1	87	59	28	73				N. W.	Clear	
2	87	66	21	78				W.	Partly cloudy	
3	76	63	13	63				N. N. W.	Clear	
4	74	59	15	67				E. S. E.	Cloudy	
5	85	51	34	73				N.	Clear	
6	91	53	38	73				W. N. W.	Clear	
7	83	53	30	74				S. S. E.	Clear	
8	85	62	23	72	.44			W. S. W.	Partly cloudy	Rain early a. m.
9	91	58	33	74				E.	Clear	
10	99	61	38	84				E. S. E.	Clear	
11	90	72	18	76				S.	Clear	
12	86	55	31	74				W. N. W.	Clear	
13	89	62	27	76				S.	Partly cloudy	
14	86	56	30	69				W.	Clear	
15	87	53	34	74				S. W.	Clear	
16	68	59	9	59	.25			W.	Cloudy	Rain
17	78	54	24	66				W. N. W.	Clear	
18	72	51	21	63				E. N. E.	Clear	
19	72	51	21	61				E.	Clear	
20	74	52	22	62				E. S. E.	Clear	
21	88	50	38	69				E. S. E.	Clear	
22	79	51	28	67	.11			S.	Cloudy	Rain
23	86	58	28	77				S. S. W.	Clear	
24	90	58	32	72				W.	Clear	
25	95	64	31	70	.55			S. S. E.	Clear	Thunderstorm p. m.
26	83	65	18	70				N. N. W.	Clear	
27	90	62	29	74				W. N. W.	Clear	
28	83	63	20	70	.23			W. S. W.	Partly cloudy	Thunderstorm
29	87	55	32	69				N. E.	Clear	
30	78	54	24	68	.12			S. W.	Partly cloudy	Thunderstorm a. m.
31	78	57	21	68				W.	Clear	
Sum	2597	1787			1.79					
Mean	83.8	57.6								

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 83.8; Mean minimum, 57.6; Mean, 70.7; Maximum, 99; Date, 10; Minimum, 50; Date, 21; Greatest daily range, 38.
Precipitation—Total, 1.79 inches; Greatest in 24 hours, .55; Date, 25.
Number of Days—With .01 inch or more precipitation, 6; Clear, 23; Partly cloudy, 5; Cloudy, 3.
Dates of—Thunderstorms, 25, 28, 30.

Meteorological Record: Month of August, 1910.

August, 1910.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	83	54	29	68	.....	.....	.....	N. W.	Clear	.....
2	82	52	30	63	.58	.....	.....	S.	Partly cloudy	Thunderstorm
3	74	53	21	66	.04	.....	.....	S. S. E.	Partly cloudy	Shower
4	77	62	15	64	1.44	.....	.....	S.	Cloudy	Rain
5	77	60	17	66	.....	.....	.....	W.	Clear	.....
6	73	53	20	66	.01	.....	.....	W.	Partly cloudy	Shower early a. m.
7	78	54	24	65	.....	.....	.....	W.	Clear	.....
8	78	53	25	66	.....	.....	.....	W. N. W.	Partly cloudy	.....
9	73	52	21	63	.....	.....	.....	E. N. E.	Cloudy	.....
10	68	55	13	63	.....	.....	.....	S. E.	Partly cloudy	.....
11	73	58	15	62	.56	.....	.....	E. N. E.	Cloudy	Rain
12	82	55	27	68	.....	.....	.....	W. N. W.	Clear	.....
13	86	49	37	73	.....	.....	.....	N. W.	Clear	.....
14	89	63	26	73	.02	.....	.....	S. W.	Clear	Shower early a. m.
15	89	66	23	77	.....	.....	.....	S. W.	Clear	.....
16	73	60	13	63	.....	.....	.....	N. N. E.	Cloudy	.....
17	72	54	18	61	.....	.....	.....	E. N. E.	Clear	.....
18	72	49	23	59	.....	.....	.....	S. E.	Cloudy	.....
19	75	55	20	65	.37	.....	.....	S. W.	Cloudy	Rain
20	73	50	23	58	.....	.....	.....	N. N. W.	Clear	.....
21	80	43	37	67	.....	.....	.....	E. S. E.	Clear	.....
22	83	53	30	66	.....	.....	.....	S. E.	Clear	.....
23	83	53	30	77	.....	.....	.....	S. S. W.	Clear	.....
24	87	59	28	76	.....	.....	.....	S. S. W.	Clear	.....
25	85	65	20	77	.....	.....	.....	S. S. W.	Clear	.....
26	84	70	14	62	.....	.....	.....	S. S. W.	Partly cloudy	.....
27	73	38	35	56	.....	.....	.....	N. W.	Clear	.....
28	82	39	43	63	.....	.....	.....	S. S. E.	Clear	.....
29	72	50	22	60	.....	.....	.....	S. S. E.	Partly cloudy	.....
30	69	53	16	54	.....	.....	.....	E.	Clear	.....
31	67	38	29	61	.....	.....	.....	S. S. E.	Clear	.....
Sum	2412	1668	.....	.....	3.02	.....	.....	.....	.....	.....
Mean	77.8	53.8	.....	.....	.....	.....	.....	.....	.....	.....

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 77.8; Mean minimum, 53.8; Mean, 65.8; Maximum, 89; Date, 14 and 15; Minimum, 38; Date, 27 and 31; Greatest daily range, 43.

Precipitation—Total, 3.02 inches; Greatest in 24 hours, 1.44; Date, 4.

Number of Days—With .01 inch or more precipitation, 7; Clear, 18; Partly cloudy, 7; Cloudy, 6.

Dates of—Thunderstorms, 2.

Meteorological Record: Month of September, 1910.

September, 1910.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	65	58	7	60	.35			S. S. E.	Cloudy	Rain
2	69	53	16	57				N. E.	Partly cloudy	
3	67	41	26	59	1.25			S. E.	Cloudy	Rain
4	83	52	31	66				S. S. E.	Clear	
5	72	60	12	61	.58			S. S. E.	Cloudy	Rain
6	68	48	20	60	.13			N. E.	Cloudy	Rain
7	79	56	23	67				E.	Clear	
8	72	53	19	63				N. W.	Clear	
9	81	55	26	61	.09			S. E.	Cloudy	Rain
10	82	39	43	53				N. W.	Clear	
11	67	39	28	55				S. S. E.	Clear	
12	69	36	33	57				S. E.	Clear	
13	74	44	30	56				S. E.	Clear	
14	67	53	14	57				E.	Cloudy	
15	73	43	30	54				E. N. E.	Clear	
16	67	42	25	54				E. N. E.	Clear	
17	67	46	21	61				N. E.	Clear	
18	82	47	35	56				N. E.	Clear	
19	55	47	8	47				E. N. E.	Cloudy	
20	73	44	29	54				E. N. E.	Cloudy	
21	74	48	26	67				N. W.	Clear	
22	68	44	24	48				N. W.	Clear	
23	72	31	41	52				N. W.	Clear	
24	67	43	24	56				E.	Cloudy	
25	73	50	23	58	.30			E. S. E.	Cloudy	Rain
26	77	55	22	59				S.	Clear	
27	65	53	12	54	.06			E. S. E.	Cloudy	
28	72	56	16	50				S.	Cloudy	
29	70	41	29	46				W. N. W.	Clear	
30	70	33	37	53				S. S. E.	Clear	
Sum	2140	1410			2.76					
Mean	71.3	47.0								

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 71.3; Mean minimum, 43.6; Mean, 57.4; Maximum, 83; Date, 4; Minimum, 31; Date, 23; Greatest daily range, 41.

Precipitation—Total, 2.76 inches; Greatest in 24 hours, 1.25; Date, 3.

Number of Days—With .01 inch or more precipitation, 7; clear, 17; Partly cloudy, 1; Cloudy, 12.

Meteorological Record: Month of October, 1910.

October, 1910.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	78	46	32	68	.....	.....	.....	S.	Clear	.....
2	63	48	15	49	.....	.....	.....	W. N. W.	Clear	High wind
3	63	38	25	48	.....	.....	.....	W. N. W.	Clear	.....
4	77	40	37	62	.....	.....	.....	S. E.	Cloudy	.....
5	86	47	39	75	.....	.....	.....	S. W.	Partly cloudy	.....
6	85	63	22	73	.....	.....	.....	S. W.	Clear	.....
7	65	46	19	48	.36	.....	.....	W	Cloudy	Rain
8	57	37	20	48	.....	.....	.....	E. S. E.	Partly cloudy	.....
9	58	43	15	49	.....	.....	.....	N.	Clear	.....
10	70	39	31	64	.....	.....	.....	W. N. W.	Clear	.....
11	65	39	26	41	.....	.....	.....	N. W.	Clear	.....
12	55	29	26	36	.....	.....	.....	N. W.	Clear	Killing frost
13	63	29	34	52	.....	.....	.....	S. W.	Cloudy	.....
14	57	42	15	47	.06	.....	.....	N.	Cloudy	.....
15	72	43	29	58	.....	.....	.....	E. S. E.	Clear	.....
16	70	42	28	53	.....	.....	.....	E. S. E.	Clear	.....
17	67	44	23	58	.....	.....	.....	N. W.	Clear	.....
18	60	37	23	51	.....	.....	.....	S. E.	Clear	.....
19	83	38	45	72	.....	.....	.....	S. S. E.	Clear	.....
20	67	46	21	46	.....	.....	.....	S. W.	Partly cloudy	.....
21	54	35	19	46	.....	.....	.....	N. E.	Clear	.....
22	53	33	20	44	.64	.....	.....	N. E.	Cloudy	Rain
23	53	40	13	48	.12	.....	.....	N. E.	Cloudy	Rain
24	57	40	17	42	.....	.....	.....	W. N. W.	Clear a. m.	.....
25	57	31	26	46	.44	.....	.....	W.	Partly cloudy	Thunderstorm p. m.
26	55	39	16	39	.02	.....	.....	W. N. W.	Partly cloudy	.....
27	52	33	19	39	.....	.....	.....	W. N. W.	Cloudy	.....
28	54	34	20	42	.....	.....	.....	W. S. W.	Cloudy	.....
29	51	25	26	39	.....	.....	.....	W.	Clear	Frosty
30	47	31	16	36	.....	.....	.....	N. W.	Clear	.....
31	53	17	36	31	.....	.....	.....	N. W.	Clear	Frosty
Sum	1947	1194	.....	....	1.64	.....	.....	.....	.....	.....
Mean	62.8	38.6	.....	.....	.....	.....	.....	.....	.....	.....

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 62.8; Mean minimum, 38.6; Mean, 50.7; Maximum, 86; Date, 5; Minimum, 17; Date, 31; Greatest daily range, 45.

Precipitation—Total, 1.64 inches; Greatest in 24 hours, .64; Date, 22.

Number of Days—With .01 inch or more precipitation, 6; Clear, 18; Partly cloudy, 4; Cloudy, 19.

Dates of—Killing frost, 12; Thunderstorms, 25.

Meteorological Record: Month of November, 1910.

November, 1910.	Temperature.				Precipitation.				Character of day.	‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.	Prevailing wind direction.		
1	55	22	33	38				N. W.	Clear	
2	53	27	26	51				S. S. E.	Clear	
3	47	45	2	44	.35			E. S. E.	Cloudy	Rain
4	48	39	9	45	.07			N. E.	Cloudy	
5	53	41	12	49	.45			N. N. E.	Partly cloudy	
6	52	36	16	42				S. W.	Partly cloudy	
7	46	29	17	30				W. N. W.	Clear	
8	47	26	21	34				S. W.	Partly cloudy	
9	46	24	22	35				W.	Clear	
10	39	26	13	33	.12			W.	Cloudy	
11	52	30	22	43				W. N. W.	Partly cloudy	
12	43	25	18	33				W. N. W.	Partly cloudy	
13	40	23	17	34				W.	Cloudy	
14	44	25	19	36				W.	Clear	
15	42	23	19	33				N. W.	Clear	
16	49	29	20	36				N. W.	Clear	
17	44	32	12	33				W. N. W.	Clear	
18	43	28	15	34				W. N. W.	Clear	
19	44	26	18	38				W. N. W.	Cloudy	
20	41	22	19	28				W. N. W.	Clear	
21	43	14	29	37				N. N. W.	Clear	
22	36	29	7	31	.38			N. W.	Cloudy	Rain
23	46	28	18	39				N.	Clear	
24	47	28	19	33				N.	Partly cloudy	
25	43	26	17	36	.04			N. W.	Cloudy	
26	43	32	11	39				N. W.	Cloudy	
27	43	29	14	29				N. N. W.	Partly cloudy	
28	46	32	14	37				N.	Partly cloudy	
29	38	30	8	33	.60			N. N. E.	Cloudy	Rain and snow
30	42	31	11	36				N. N. E.	Cloudy	
Sum	1355	857			2.01					
Mean	45.2	28.6								

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 45.2; Mean minimum, 28.6; Mean, 36.9; Maximum, 55; Date, 1; Minimum, 14; Date, 21; Greatest daily range, 33.
Precipitation—Total, 2.01 inches; Greatest in 24 hours, .60; Date, 29.
Number of Days—With .01 inch or more precipitation, 7; Clear, 12; Partly cloudy, 8; Cloudy, 10.

Meteorological Record: Month of December, 1910.

December, 1910.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	34	28	6	31	.07	1¾	.....	W. N. W.	Cloudy	Snow late p. m.
2	33	24	9	29	.....	.....	.....	W.	Clear	.....
3	30	16	14	28	.....	.....	.....	W. N. W.	Clear	.....
4	32	14	18	25	.....	.....	.....	W. N. W.	Clear	.....
5	33	4	29	20	.....	.....	.....	W. N. W.	Cloudy	.....
6	22	7	15	15	.....	.....	.....	N.	Cloudy	.....
7	31	8	23	27	.....	.....	.....	N.	Clear	.....
8	32	11	21	20	.....	.....	.....	W.	Clear	.....
9	23	14	9	16	.....	.....	.....	W.	Clear	.....
10	21	1	20	6	.....	.....	.....	W. N. W.	Clear	.....
11	24	—2	26	18	.....	.....	.....	N. W.	Clear	.....
12	32	11	21	14	.....	.....	.....	N. N. W.	Clear	.....
13	28	10	18	23	.....	.....	.....	N. N. E.	Clear	.....
14	33	15	18	28	.....	.....	.....	W. N. W.	Cloudy	.....
15	36	18	18	28	.06	1½	.....	S. W.	Cloudy	Snow
16	13	2	11	10	.....	.....	.....	N. W.	Clear	.....
17	19	5	14	15	.....	.....	.....	N. W.	Partly cloudy	.....
18	32	8	24	26	.....	.....	.....	N. W.	Clear	.....
19	27	14	13	20	.....	.....	.....	N. W.	Clear	.....
20	34	20	14	26	.....	.....	.....	N. W.	.....	.....
21	25	18	7	21	.....	.....	.....	N. W.	Partly cloudy	.....
22	20	..	20	22	.14	5	.....	N. W.	Cloudy	Snow late p. m.
23	45	—4	49	26	.....	.....	.....	N.	Clear	.....
24	46	5	41	42	.84	7	.....	N. E.	Cloudy	Snow and rain
25	34	23	11	23	.....	.....	.....	N. W.	Clear	.....
26	23	5	18	20	.10	1½	.....	N. W.	Cloudy	Snow
27	26	6	20	24	.....	.....	.....	N. W.	Cloudy	.....
28	42	6	36	37	.....	.....	.....	W.	Partly cloudy	.....
29	48	30	18	40	.15	.....	.....	S. E.	Cloudy	Rain
30	48	32	16	20	.03	.....	.....	S. W.	Cloudy	.....
31	22	—5	27	12	.....	.....	.....	W. N. W.	Clear	.....
Sum	948	344	.....	.....	1.39	16¾	.....	.....	.....	.....
Mean	30.6	11.1	.....	.....	.....	.....	.....	.....	.....	.....

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 30.6; Mean minimum, 11.1; Mean, 20.8; Maximum, 48; Date, 29 and 0; Minimum, —5; Date, 31; Greatest daily range, 49.
Precipitation—Total, 1.39 inches; Greatest in 24 hours, .84; Date, 24.
Snow—Total fall, 16¾ inches.
Number of Days—With .01 inch or more precipitation, 7; Clear, 17; Partly cloudy, 3; Cloudy, 11.

Meteorological Record: Month of January, 1911.

January, 1911.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	38	—1	39	29	.15	.....	.....	W. N. W.	Partly cloudy	Rain p. m.
2	57	20	37	48	.03	.....	.....	S. S. W.	Cloudy	Rain
3	50	46	4	46	.62	.....	.....	S. W.	Cloudy	Rain
4	25	21	4	15	.....	.....	.....	W. N. W.	Clear	.....
5	25	—5	30	13	.....	.....	.....	W. N. W.	Clear	.....
6	23	—8	31	19	.....	.....	.....	W. N. W.	Cloudy	.....
7	30	12	18	27	.10	4	.....	W. N. W.	Cloudy	Snow
8	35	02	33	15	.10	.....	.....	W. N. W.	Partly cloudy	Rain p. m.
9	37	32	5	30	.....	.....	.....	S. W.	Clear	.....
10	35	24	11	25	.....	.....	.....	N. W.	Clear	.....
11	45	23	22	37	.....	.....	.....	W.	Clear	.....
12	42	27	15	30	.....	.....	.....	W. S. W.	Partly cloudy	.....
13	45	17	28	29	.....	.....	.....	E.	Clear	.....
14	42	21	21	35	.05	.....	.....	N. E.	Cloudy	Rain
15	33	24	9	18	.....	.....	.....	N. W.	Clear	.....
16	10	0	10	6	.....	.....	.....	N. W.	Clear	.....
17	15	—1	16	7	.....	.....	.....	N. W.	Clear	.....
18	19	0	19	5	.....	.....	.....	N. W.	Clear	.....
19	36	3	33	28	.....	.....	.....	W. N. W.	Partly cloudy	.....
20	37	12	25	30	.....	.....	.....	W. N. W.	Clear	.....
21	46	23	23	37	.07	.....	.....	S. S. W.	Cloudy	Rain
22	28	21	7	25	.....	.....	.....	N. W.	Cloudy	.....
23	29	15	14	23	.....	.....	.....	N. W.	Partly cloudy	.....
24	36	6	30	27	.....	.....	.....	N. W.	Clear	.....
25	41	11	30	27	.....	.....	.....	S. W.	Clear	.....
26	42	17	25	30	.05	2	.....	N. N. W.	Cloudy	Snow
27	44	16	28	38	.14	.....	.....	W. N. W.	Cloudy	Rain and snow
28	43	30	13	36	.08	.....	.....	N.	.....	Rain
29	38	11	27	30	.....	.....	.....	S. W.	Partly cloudy	.....
30	38	34	4	36	.03	.....	.....	W. N. W.	Cloudy	Snow flurry
31	14	4	10	12	.....	.....	.....	W.	Clear	.....
Sum	1078	457	.....	.....	1.42	6	.....	.....	.....	.....
Mean	34.8	14.7	.....	.....	.....	.....	.....	.....	.....	.....

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted show.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 34.8; Mean minimum, 14.7; Mean, 24.8; Maximum, 57; Date, 2 and 20; Minimum, —8; Date, 6; Greatest daily range, 39.
Precipitation—Total, 1.42 inches; Greatest in 24 hours, .62; Date, 3.
Snow—Total fall, 6 inches.
Number of Days—With .01 inch or more precipitation, 11; Clear, 14; Partly cloudy, 6; Cloudy, 11.

Meteorological Record: Month of February, 1911.

February, 1911.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	22	5	17	17	.....	.....	.....	W.	Clear	.....
2	22	5	17	13	.12	5	5″	N. W.	Cloudy	Snow
3	29	3	26	12	.....	.....	.....	W.	Clear	.....
4	38	29	9	34	1.08	3	.....	W.	Cloudy	Snow and rain
5	38	28	10	10	.....	.....	.....	N. W.	Clear	.....
6	17	—4	21	10	.....	.....	.....	W. N. W.	Clear	.....
7	18	0	18	13	.13	2	7″	W. N. W.	Cloudy	Snow
8	27	9	18	25	.06	1	7″	W. N. W.	Cloudy	Snow
9	34	17	17	28	.....	.....	.....	W. N. W.	Cloudy	.....
10	33	24	9	25	.....	.....	.....	W.	Cloudy	.....
11	35	15	20	21	.08	1	8″	N. W.	Partly cloudy	Snow
12	25	9	16	22	.....	.....	.....	N. W.	Partly cloudy	.....
13	27	15	12	22	.....	.....	.....	W.	Partly cloudy	.....
14	24	13	11	16	.13	1½	9″	N. W.	Cloudy	Snow
15	20	—1	21	18	.....	.....	.....	W. N. W.	Clear	.....
16	46	4	42	11	.....	.....	.....	N. W.	Clear	.....
17	36	10	26	28	.....	.....	.....	N. W.	Cloudy	.....
18	44	22	22	30	.....	.....	.....	N. W.	Cloudy	.....
19	40	18	22	27	.....	.....	.....	N. W.	Clear	.....
20	17	3	14	21	.29	5	10″	N. W.	Cloudy	Snow
21	22	6	16	12	.....	.....	.....	N. W.	Clear	.....
22	30	4	26	10	.....	.....	.....	N. W.	Clear	.....
23	31	12	19	20	.....	.....	.....	W.	Clear	.....
24	34	14	20	23	.....	.....	.....	W.	Cloudy	.....
25	46	17	29	28	.....	.....	.....	N. W.	Cloudy	.....
26	48	20	28	28	.....	.....	.....	N. W.	Partly cloudy	.....
27	51	22	29	30	.....	.....	.....	N. W.	Clear	.....
28	27	9	18	12	.....	.....	.....	W. N. W.	Clear	.....
Sum	881	328	.....	.....	1.89	18½	.....	.....	.....	.....
Mean	31.5	12	.....	.....	.....	.....	.....	.....	.....	.....

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 32; Mean minimum, 12; Mean, 22; Maximum, 51; Date, 27; Minimum, —4; Date, 6; Greatest daily range, 42.
Precipitation—Total, 1.89 inches.
Snow—Total fall, 18½ inches.
Number of Days—With .01 inch or more precipitation, 7; Clear, 12; Partly cloudy, 4; Cloudy, 12.

Meteorological Record: Month of March, 1911.

March, 1911.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	35	2	33	29				W. S. W.	Clear	
2	37	19	18	29				W.	Partly cloudy	
3	35	14	21	25				W.	Clear	
4	29	16	13	22				S.	Partly cloudy	
5	17	15	2	18				W. N. W.	Clear	
6	23	13	10	18	.03	2		N. W.	Cloudy	Snow
7	32	8	24	12				N.	Clear	
8	43	4	39	28				N. N. E.	Clear	
9	35	8	27	29				N.	Clear	
10	39	18	21	27	.05	4		N. W.	Cloudy	Snow
11	47	22	25	29				N. W.	Clear	
12	38	20	18	32				N. W.	Partly cloudy	
13	42	32	10	32				N.	Clear	
14	49	18	31	36				N. N. W.	Clear	
15	42	29	13	38				W. S. W.	Clear	
16	15	6	9	15				W. N. W.	Partly cloudy	
17	34	12	22	28				S. W.	Clear	
18	38	25	13	29	.02	1		S. S. W.	Cloudy	Snow
19	40	18	22	39				N. N. W.	Clear	
20	43	28	15	39	.80	6		N. W.	Partly cloudy	Snow early a. m.
21	36	31	5	31				N. W.	Clear	
22	40	25	15	37	.05	1		W. N. W.	Cloudy	Rain
23	41	25	16	28				W. N. W.	Clear	
24	24	11	13	13				W. N. W.	Clear	
25	42	9	33	27				W. N. W.	Clear	
26	62	21	41	45				W. S. W.	Clear	
27	52	37	15	43	.19			S.	Cloudy	Rain
28	43	36	7	29				W.	Partly cloudy	
29	52	29	23	38	.09			W.	Partly cloudy	Rain
30	46	31	15	38				W. S. W.	Partly cloudy	
31	37	29	8	29				W. S. W.	Cloudy	
Sum	1188	611			123	14				
Mean	38	19.7								

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 38; Mean minimum, 19.7; Mean, 28.8; Maximum, 62; Date, 26; Minimum, 2; Date, 1; Greatest daily range, 41.
Precipitation—Total, 1.23 inches; greatest in 24 hours, .80; Date, 20.
Snow—Total fall, 14 inches.
Number of Days—With .01 inch or more precipitation, 7; Clear, 17; Partly cloudy, 8; Cloudy, 6.

Meteorological Record: Month of April, 1911.

April, 1911.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	35	24	11	29	.....	.....	.....	W.	Clear	.....
2	27	25	2	36	.....	.....	.....	W. N. W.	Partly cloudy	.....
3	37	23	14	28	.....	.....	.....	W. N. W.	Clear	.....
4	37	14	23	30	.....	.....	.....	N. W.	Clear	.....
5	46	28	18	32	.59	8	.....	N. N. E.	Cloudy	Snow
6	67	31	36	45	.....	.....	.....	W. N. W.	Clear	.....
7	58	43	15	43	.....	.....	.....	W. S. W.	Cloudy	.....
8	56	34	22	43	.....	.....	.....	N. W.	Clear	.....
9	38	28	10	29	39	5	.....	N. N. E.	Cloudy	Snow
10	48	24	24	39	.....	.....	.....	N. N. W.	Clear	.....
11	47	25	22	28	.....	.....	.....	N. W.	Clear	.....
12	47	20	27	27	.....	.....	.....	N. W.	Clear	.....
13	63	19	44	42	.....	.....	.....	E. S. E.	Clear	.....
14	58	34	24	46	.29	.....	.....	S. S. E.	Partly cloudy	Rain
15	57	43	14	46	.....	.....	.....	W. S. W.	Cloudy	.....
16	48	34	14	40	.....	.....	.....	W. N. W.	Cloudy	.....
17	51	28	23	40	.....	.....	.....	W. N. W.	Cloudy	.....
18	47	33	14	40	.....	.....	.....	N. W.	Clear	.....
19	62	31	31	44	.....	.....	.....	N. W.	Clear	.....
20	47	34	13	34	.....	.....	.....	E. N. E.	Cloudy	.....
21	50	29	21	40	.....	.....	.....	N. E.	Clear	.....
22	43	27	16	38	.....	.....	.....	N. E.	Clear	.....
23	43	30	13	29	.....	.....	.....	N. E.	Cloudy	.....
24	64	27	37	44	.....	.....	.....	N. E.	Clear	.....
25	65	38	27	44	.....	.....	.....	W. N. W.	Clear	.....
26	72	41	31	48	.....	.....	.....	S. E.	Clear	.....
27	80	34	46	52	.....	.....	.....	S. S. E.	Clear	.....
28	82	43	39	53	.....	.....	.....	S.	Clear	.....
29	84	44	40	56	.....	.....	.....	S. E.	Clear	.....
30	83	40	43	62	.....	.....	.....	S. E.	Clear	.....
Sum	1642	928	.....	....	1.27	13	.....	.....	.....	.....
Mean	54.7	30.9	.....	....	.....	.....	.....	.....	.....	.....

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 54.7; Mean minimum, 30.7; Mean, 42.7; Maximum, 84; Date, 29; Minimum, 14; Date, 4.; Greatest daily range, 46.
Precipitation—Total, 1.27 inches; Greatest in 24 hours, .59; Date, 5.
Snow—Total fall, 13 inches.
Number of Days—With .01 inches or more precipitation, 3; Clear, 20; Partly cloudy, 2; Cloudy, 8.

Meteorological Record: Month of May, 1911.

May, 1911.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	75	53	22	64				S.	Cloudy	
2	75	44	31	44	.05			N. N. E.	Clear	Shower early a. m.
3	46	34	12	34				N. N. W.	Cloudy	Snow flurries
4	53	25	28	47				N. N. W.	Clear	
5	62	27	35	43				N. N. E.	Clear	
6	72	31	41	48				S. W.	Clear	
7	80	33	47	57				S. E.	Clear	
8	83	45	38	60				N. N. E.	Clear	
9	72	52	20	57	.02			N. N. W.	Cloudy	Shower
10	77	50	27	54				E. S. E.	Cloudy	
11	84	57	37	77				S. W.	Clear	
12	92	63	29	72	.04			S. W.	Partly cloudy	Thunderstorm
13	76	56	20	56				N.	Partly cloudy	
14	63	41	22	52				N. E.	Clear	
15	76	34	42	66				W. S. W.	Clear	
16	75	45	30	50				N. W.	Cloudy	
17	73	39	34	61				N. E.	Clear	
18	82	54	28	63				S. W.	Clear	
19	74	48	26	57	.03			S. E.	Cloudy	
20	67	50	17	52				S. E.	Cloudy	
21	92	54	38	79				S. W.	Clear	
22	94	60	34	81				S. W.	Clear	
23	57	54	23	53				S. S. E.	Cloudy	
24	56	47	9	48	.56			E.	Cloudy	Thunderstorm
25	62	46	16	53				E.	Clear	
26	66	49	17	53				S. S. W.	Partly cloudy	
27	76	47	29	62				S. E.	Clear	
28	92	47	45	75				S. E.	Clear	
29	92	59	33	78				S. E.	Clear	
30	78	58	20	63				N. E.	Clear	
31	67	51	16	55	.40			E.	Cloudy	Showers
Sum	2289	1453			1.10					
Mean	73.7	43.5								

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 73.7; Mean minimum, 46.4; Mean, 60; Maximum, 94; Date, 22; Minimum, 25; Date, 4; Greatest daily range, 47.

Precipitation—Total, 1.10 inches; Greatest in 24 hours, .56; Date, 24.

Number of Days—With .01 inch or more precipitation, 6; Clear, 18; Partly cloudy, 2; Cloudy, 10.

Dates of—Thunderstorms, 12, 24.

Meteorological Record: Month of June, 1911.

June, 1911.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	76	53	23	60	.....	.....	.....	W. S. W.	Cloudy	.....
2	77	48	29	63	.....	.....	.....	S. E.	Clear	.....
3	73	46	27	56	.....	.....	.....	N. E.	Clear	.....
4	74	40	34	58	.....	.....	.....	S. W.	Clear	.....
5	63	43	20	55	.....	.....	.....	W. S. W.	Partly cloudy	.....
6	57	49	8	54	.51	.....	.....	S. S. W.	Cloudy	Rain
7	75	50	25	64	.....	.....	.....	S. S. E.	Cloudy	.....
8	84	45	39	72	.....	.....	.....	S. E.	Cloudy	.....
9	83	53	30	67	.10	.....	.....	S. E.	Cloudy	Rain
10	63	56	7	54	.....	.....	.....	S. S. E.	Cloudy	.....
11	54	48	6	50	.13	.....	.....	S. E.	Cloudy	Rain
12	61	46	15	53	.63	.....	.....	S. E.	Cloudy	Rain
13	84	62	22	77	.....	.....	.....	S. W.	Clear	.....
14	76	50	26	66	.20	.....	.....	S. S. E.	Cloudy	Rain
15	77	56	21	57	.26	.....	.....	E.	Partly cloudy	Rain
16	69	46	23	57	.....	.....	.....	E.	Cloudy	.....
17	77	50	27	67	.....	.....	.....	N. W.	Clear	.....
18	82	53	29	73	.....	.....	.....	N. E.	Clear	.....
19	74	54	20	64	.....	.....	.....	N. N. W.	Clear	.....
20	78	55	23	63	.....	.....	.....	N. N. W.	Clear	.....
21	68	49	19	60	.....	.....	.....	N. E.	Clear	.....
22	74	54	20	65	.....	.....	.....	N. E.	Clear	.....
23	73	60	13	63	.....	.....	.....	N. N. E.	Clear	.....
24	77	47	30	54	.....	.....	.....	N. E.	Clear	.....
25	69	44	25	58	.....	.....	.....	E.	Clear	.....
26	75	51	24	60	.....	.....	.....	N. W.	Partly cloudy	.....
27	74	57	17	59	.....	.....	.....	S. W.	Cloudy	.....
28	76	59	17	67	.....	.....	.....	S. W.	Cloudy	.....
29	84	60	24	70	.....	.....	.....	N. N. W.	Clear	.....
30	80	55	25	67	.....	.....	.....	S. S. E.	Clear	.....
Sum	2207	1539	.....	....	1.83	.....	.....	.....	.....	.....
Mean	73.6	51.3	.....	....	.....	.....	.....	.....	.....	.....

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 73.6; Mean minimum, 51.3; Mean, 62.5; Maximum, 84; Date, 8 and 29; Minimum, 40; Date, 4; Greatest daily range, 8.

Precipitation—Total, 1.83 inches; Greatest in 24 hours, .63; Date, 12.

Number of Days—With .01 inch or more precipitation, 6; Clear, 15; Partly cloudy, 3; Cloudy, 12.

Meteorological Record: Month of July, 1911.

July, 1911.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	90	57	33	75				N. W.	Clear	
2	94	64	30	86				N. N. E.	Clear	
3	103	68	35	91				S. W.	Clear	
4	103	73	30	88				W.	Clear	
5	97	72	25	83				S. W.	Clear	
6	102	72	30	74	.62			S. W.	Partly cloudy	Thunderstorm
7	83	68	15	66				W. N. W.	Clear	
8	84	50	34	70				S. S. W.	Clear	
9	94	58	36	80				S. W.	Clear	
10	101	68	33	85				W.	Clear	
11	100	73	27	93				W. S. W.	Clear	
12	98	73	25	85				N. N.W.	Clear	
13	87	61	26	76				S. W.	Clear	
14	72	60	12	72				N. N. E.	Clear	
15	86	59	27	76				W. S. W.	Clear	
16	83	59	24	65				S. W.	Clear	
17	72	63	9	64	.21			S. W.	Cloudy	Rain a. m.
18	83	64	19	69				N. W.	Clear	
19	87	56	31	66				S. S. E.	Clear	
20	83	49	34	74	.21			W. S. W.	Partly cloudy	Showers
21	77	54	23	68				N. N. E.	Clear	
22	85	54	31	66				N. E.	Clear	
23	84	55	29	74				W.	Clear	
24	84	61	23	77	.51			N. E.	Cloudy	Rain
25	77	60	17	68				W.	Clear	
26	82	49	33	64				S. W.	Clear	
27	80	52	28	66				N. W.	Clear	
28	67	55	12	58	2.75			E.	Cloudy	Rain
29	73	58	15	67	.54			N. E.	Cloudy	Rain early a. m.
30	77	57	20	68	.12			N. N. W.	Partly cloudy	
31	92	57	35	78				N. W.	Clear	
Sum	2680	1879			4.96					
Mean	86.4	60 6								

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 86.4; Mean minimum, 61; Mean, 737; Maximum, 103; Date, 3 and 4; Minimum, 49; Date, 20; Greatest daily range, 36.

Precipitation—Total, 4.96 inches; Greatest in 24 hours, 2.75; Date, 28.

Number of Days—With .01 inch or more precipitation, 7; Clear, 24; Partly cloudy, 3; Cloudy, 4.

Dates of—Thunderstorms, 6.

Meteorological Record: Month of August, 1911.

August, 1911.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	81	61	20	62				N. E.	Clear	
2	64	55	9	63				E.	Cloudy	
3	73	58	15	62				S. E.	Cloudy	
4	80	55	25	64				S. W.	Cloudy	
5	77	49	28	62				S. E.	Clear	
6	76	57	19	64				S. E.	Clear	
7	82	58	24	65				S. E.	Clear	
8	75	58	17	64				S. E.	Cloudy	
9	87	62	25	68				S.	Clear	
10	93	60	33	78				S. W.	Clear	
11	77	64	13	66				W.	Cloudy	
12	78	52	26	68				N.	Clear	
13	83	50	33	71				W.	Clear	
14	89	52	37	65				W.	Clear	
15	91	59	32	68	.40			N. W.	Clear	Thundershower p. m.
16	77	64	13	68				N. W.	Clear	
17	83	55	28	66				N. W.	Clear	
18	84	53	31	63	.98			N. W.	Cloudy	Rain
19	72	59	13	56				W.	Cloudy	
20	73	38	35	58				N. W.	Cloudy	
21	81	43	38	57				W.	Cloudy	
22	83	49	34	62				N. W.	Cloudy	
23	85	51	34	56				S.	Cloudy	
24	78	47	31	58				N. W.	Cloudy	
25	64	55	9	60	.82			N. W.	Cloudy	Rain
26	68	54	14	62				N. W.	Cloudy	
27	64	55	9	58				N. W.	Cloudy	Rain late p. m.
28	73	56	17	59	.78			N. W.	Cloudy	Rain
29	70	58	12	56	.82			S. W.	Cloudy	Rain
30	64	51	13	55	.04			S W.	Cloudy	Rain
31	59	49	10	55	.42			N. E.	Cloudy	Rain
Sum	2384	1687			4.26					
Mean	77	54.4								

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 77; Mean minimum, 54.4; Mean, 65.7; Maximum, 93; Date, 10; Minimum, 38; Date, 20; Greatest daily range, 38.

Precipitation—Total, 4.26 inches; Greatest in 24 hours, .98; Date, 18.

Number of Days—With .01 inch or more precipitation 7; Clear, 12; Cloudy, 19.

Dates of—Thunderstorms, 15.

Meteorological Record: Month of September, 1911.

September, 1911.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	72	52	20	60	.02	.....	.....	N. E.	Cloudy	Showers
2	83	53	30	65	.....	.....	.....	S. W.	Clear	.....
3	76	61	15	53	.....	.....	.....	N. W.	Clear	.....
4	72	44	28	59	.....	.....	.....	N. W.	Clear	.....
5	74	44	30	55	.....	.....	.....	N. W.	Clear	.....
6	81	53	28	60	.42	.....	.....	N. E.	Cloudy	Rain
7	64	47	17	55	.....	.....	.....	N. W.	Cloudy	.....
8	55	47	8	55	.....	.....	.....	S. S. E.	Cloudy	Rain p. m.
9	68	52	16	57	.24	.....	.....	N. E.	Cloudy	Rain
10	76	53	23	50	.....	.....	.....	N.	Clear	.....
11	81	51	30	57	.23	.....	.....	S. W.	Partly cloudy	Rain
12	75	51	24	46	.....	.....	.....	S. W.	Cloudy	.....
13	57	36	21	40	.....	.....	.....	N. E.	Clear	.....
14	63	30	33	40	.....	.....	.....	N. E.	Clear	.....
15	59	30	29	48	.42	.....	.....	S. E.	Cloudy	Rain
16	75	46	29	58	.....	.....	.....	N. W.	Cloudy	.....
17	65	54	11	54	.....	.....	.....	N. W.	Cloudy	.....
18	72	53	19	56	.....	.....	.....	N. E.	Cloudy	.....
19	74	53	21	65	.....	.....	.....	N. E.	Cloudy	.....
20	78	60	18	63	.....	.....	.....	S. S. E.	Fair	.....
21	75	61	14	64	.....	.....	.....	S. S. E.	Fair	.....
22	73	52	21	64	.....	.....	.....	S. W.	Fair	.....
23	68	51	17	57	.....	.....	.....	S. S. E.	Fair	.....
24	62	41	21	55	.....	.....	.....	S. E.	Cloudy	.....
25	85	57	28	66	.35	.....	.....	N. E.	Cloudy	Rain
26	68	52	16	53	.18	.....	.....	N. W.	Cloudy	Rain
27	59	42	17	56	.58	.....	.....	N. N. E.	Cloudy	Rain
28	58	45	13	45	.....	.....	.....	E.	Cloudy	Rain p. m.
29	50	30	20	49	.65	.....	.....	E. S. E.	Cloudy	Rain
30	56	40	16	48	.....	.....	.....	N. E.	Partly cloudy	.....
Sum	2074	1441	.....	.....	3.09	.....	.....	.....	.....	.....
Mean	69.1	48.	.....	.....	.....	.....	.....	.....	.....	.....

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 69.1; Mean minimum, 48.0; Mean, 58.5; Maximum, 85; Date, 25; Minimum, 30; Date, 14, 15 and 29; Greatest daily range, 33.

Precipitation—Total, 3.09 inches; Greatest in 24 hours, .65; Date, 29.

Number of Days—With .01 inch or more precipitation, 9; Clear, 12; Partly cloudy, 2; Cloudy, 16.

Meteorological Record: Month of October, 1911.

October, 1911.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	55	42	13	45	.20	.....	.....	E. N. E.	Cloudy	Rain
2	60	46	14	44	.31	.....	.....	N. E.	Cloudy	Rain
3	60	33	27	47	.....	.....	.....	N. E.	Partly cloudy	.....
4	64	36	28	63	.44	.....	.....	S. E.	Cloudy	Rain
5	58	52	6	48	.....	.....	.....	N. W.	Clear	.....
6	52	37	15	45	.27	.....	.....	N. E.	Cloudy	Rain
7	52	33	19	45	.....	.....	.....	N. E.	Partly cloudy	.....
8	56	28	28	40	.....	.....	.....	N. W.	Clear	.....
9	67	32	35	48	.....	.....	.....	W. S. W.	Clear	.....
10	72	35	37	50	.....	.....	.....	W. S. W.	Clear	.....
11	67	35	32	48	.....	.....	.....	S. W.	Clear	.....
12	72	41	31	47	.....	.....	.....	S. W.	Clear	.....
13	54	35	19	46	.....	.....	.....	N. W.	Clear	.....
14	63	38	25	51	.....	.....	.....	N. N. E.	Clear	.....
15	59	31	28	44	.02	.....	.....	N. E.	Partly cloudy	Shower p. m.
16	67	37	30	47	.....	.....	.....	E.	Cloudy	.....
17	52	42	10	44	.....	.....	.....	E.	Cloudy	.....
18	53	46	7	51	.....	.....	.....	S. E.	Partly cloudy	.....
19	56	49	7	50	.....	.....	.....	S. W.	Partly cloudy	.....
20	58	45	13	53	.....	.....	.....	S. E.	Partly cloudy	.....
21	54	46	8	52	.20	.....	.....	E. S. E.	Cloudy	Rain
22	61	50	11	61	.18	.....	.....	S. E.	Cloudy	Rain
23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
24	58	30	28	40	.....	.....	.....	S. W.	Clear	.....
25	58	26	32	45	.....	.....	.....	N. W.	Clear	.....
26	63	32	31	43	.....	.....	.....	S.	Clear	.....
27	44	31	13	43	.....	.....	.....	S. W.	Clear	.....
28	45	27	18	28	.....	.....	.....	N. W.	Clear	.....
29	56	20	36	34	.....	.....	.....	W.	Clear	.....
30	56	28	28	36	.....	.....	.....	S. W.	Clear	.....
31	50	29	21	39	.27	.....	.....	N. W.	Cloudy	Rain p. m.
Sum	1742	1092	.....	....	1.87	.....	.....	.....	.....	.....
Mean	58.1	36.4	.....	....	.....	.....	.....	.....	.....	.....

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 58.1; Mean minimum, 36.4; Mean, 47.2; Maximum, 72; Date, 10 and 12; minimum, 20; Date, 29; Greatest daily range, 37.

Precipitation—Total, 1.87 inches; Greatest in 24 hours, .44; Date, 4.

Number of Days—With .01 inch or more precipitation, 8; Clear, 15; Partly cloudy, 6; Cloudy, 9.

Meteorological Record: Month of November, 1911.

November, 1911.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set Maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	50	33	17	43	.6			N. W.	Cloudy	
2	43	24	19	24				N.	Clear	
3	43	18	25	39				N. W.	Clear	
4	52	22	30	28				W.	Clear	
5	53	25	28	29				W.	Clear	
6	55	27	28	41				W.	Partly cloudy	Rain p. m.
7	64	36	28	44	.87			S.	Partly cloudy	
8	63	30	33	30				N.	Partly cloudy	
9	44	24	20	37				W.	Clear	
10	43	26	17	36				N. W.	Cloudy	
11	64	36	28	50				N. W.	Clear	
12	68	46	22	46				S. W.	Partly cloudy	Gale with rain p.m. late
13	67	26	41	28	.32			W.	Clear	
14	35	19	16	39				W.	Clear	
15	43	20	23	30				N. W.	Cloudy	Storm, snow and rain
16	43	28	15	26				W.	Clear	
17	39	17	22	30				W.	Partly cloudy	
18	43	28	15	41	1.05			N. N. E.	Cloudy	Rain and snow
19	43	31	12	34				W.	Fair	
20	45	25	20	38				N.	Partly cloudy	Slight snow
21	47	29	18	34				N. W.	Cloudy	
22	33	25	8	27				N. E.	Clear	
23	48	11	37	18				N. N. E.	Clear	
24	46	18	28	27	.67			N. N. E.	Cloudy	Rain
25	44	23	21	24				N. E.	Cloudy	
26	38	3	35	25				W.	Partly cloudy	
27	48	26	22	28				W.	Partly cloudy	
28	57	25	32	46	.19			W.	Cloudy	Rain p. m.
29	41	17	24	35				N. N. E.	Cloudy	
30	42	13	29	28				N. N. E.	Clear	
Sum	1444	731			3.16					
Mean	48.1	24.4								

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 48.5; Mean mimimum, 24.4; Mean, 36.5; Maximum, 68; Date, 12; Minimum, 3; Date, 26; Greatest daily range, 41.
Precipitation—Total, 3.16 inches; Greatest in 24 hours, 1.05; Date, 18.
Number of Days—With .01 inch or more precipitation, 6; Clear, 13; Partly cloudy, 8; Cloudy, 9.

Meteorological Record: Month of December, 1911.

December, 1911.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	41	17	24	26	.....	.....	.....	N. N. E.	Clear	.....
2	47	27	20	28	.....	.....	.....	N. W.	Partly cloudy	.....
3	43	22	18	22	.....	.....	.....	W.	Clear	.....
4	30	19	11	25	.....	.....	.....	W.	Clear	.....
5	34	5	29	26	.....	.....	.....	N. W.	Clear	.....
6	47	10	29	24	.....	.....	.....	N. W.	Clear	.....
7	43	18	25	30	.....	.....	.....	W.	Clear	.....
8	53	20	33	33	.....	.....	.....	N. W.	Clear	.....
9	54	21	33	28	.....	.....	.....	N.	Cloudy	.....
10	50	27	23	34	.....	.....	.....	N. W.	Clear	.....
11	66	27	39	50	.....	.....	.....	S. W.	Cloudy	.....
12	65	30	35	46	.....	.....	.....	S. W.	Partly cloudy	.....
13	58	48	10	49	.....	.....	.....	S. W.	Partly cloudy	.....
14	43	26	17	30	.....	.....	.....	N. W.	Cloudy	.....
15	35	28	7	30	.50	.....	.....	N. W.	Cloudy	Snow followed by rain
16	42	28	14	38	.60	.....	.....	N. W.	Cloudy	Rain
17	35	31	4	31	.....	.....	.....	N. E.	Cloudy	.....
18	36	28	8	29	.....	.....	.....	N. E.	Cloudy	.....
19	38	15	23	26	.....	.....	.....	E.	Partly cloudy	.....
20	24	11	13	28	.....	.....	.....	N. E.	Cloudy	.....
21	36	9	27	32	.....	.....	.....	E.	Cloudy	.....
22	36	27	9	38	.....	.....	.....	N.	Cloudy	Rain p. m.
23	48	30	18	35	2.10	.....	.....	N. W.	Cloudy	Rain
24	44	28	16	32	.....	.....	.....	W.	Clear	.....
25	47	23	24	32	.....	.....	.....	W. N. W.	Clear	.....
26	44	23	21	40	.....	.....	.....	W.	Cloudy	.....
27	48	40	8	41	.....	.....	.....	N. N. W.	Cloudy	Rain late p. m.
28	38	24	14	26	.18	.....	.....	N. W.	Cloudy	.....
29	48	28	20	30	.....	.....	.....	N. N. E.	Partly cloudy	.....
30	34	14	20	27	.....	.....	.....	N. N. E.	Clear	.....
31	28	14	14	38	.23	.....	.....	N. E.	Cloudy	Snow
Sum	1335	718	.....	.....	3.61	.....	.....	.....	.....	.....
Mean	43.2	23	.....	.....	.....	.....	.....	.....	.....	.....

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 43.4; Mean minimum, 23.0; Mean, 33.2; Maximum, 56; Date, 11; Minimum, 5; Date, 5; Greatest daily range, 39.

Precipitation—Total, 36.1 inches; Greatest in 24 hours, 2.10; Date, 23.

Number of Days—With .01 inch or more precipitation, 5; Clear, 11; Partly cloudy, 5; Cloudy, 15.

Meteorological Record: Month of January, 1912.

January, 1912.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	32	15	17	30	.....	.....	.....	E.	Partly cloudy	.....
2	36	7	29	29	.....	.....	.....	W.	Clear	.....
3	38	16	22	29	.....	.....	.....	S. W.	Clear	.....
4	30	14	16	26	.....	.....	.....	N. W.	Partly cloudy	.....
5	19	13	6	22	.15	2	.....	N. W.	Cloudy	Snow
6	23	—3	26	10	.....	.....	.....	N. W.	Clear	Cold wave
7	8	—11	19	8	.....	.....	.....	W.	Partly cloudy	.....
8	15	—9	24	13	.....	.....	.....	N. W.	Clear	Snow p. m.
9	20	10	10	15	1.18	4	.....	N. E.	Cloudy	Snow with rain
10	33	6	27	12	.....	.....	.....	S. W.	Clear	.....
11	10	—3	13	7	.....	.....	.....	W.	Clear	.....
12	14	—4	18	5	.5	2	.....	W.	Cloudy	Snow p. m.
13	11	—10	21	—3	.....	.....	.....	W.	Clear	.....
14	24	—18	42	18	.....	.....	.....	W.	Partly cloudy	.....
15	33	0	33	20	1.23	8	.....	N. W.	Cloudy	Heavy snowstorm
16	21	14	7	17	.....	.....	.....	N. W.	Cloudy	.....
17	25	6	19	28	.....	.....	.....	N. W.	Clear	.....
18	32	10	22	27	.....	.....	.....	N. W.	Cloudy	.....
19	48	26	22	29	.23	.....	.....	S. W.	Cloudy	Rain
20	18	7	11	26	.....	.....	.....	W.	Clear	.....
21	28	—3	31	18	.....	.....	.....	W.	Partly cloudy	.....
22	28	11	17	15	.....	.....	.....	W.	Clear	.....
23	26	18	8	32	.6	2	.....	W.	Cloudy	Snow
24	18	5	12	14	.7	.....	.....	N. W.	Partly cloudy	Snow
25	13	—4	17	10	.....	.....	.....	W. N. W.	Clear	.....
26	12	—18	30	12	.....	.....	.....	N. W.	Clear	.....
27	16	1	15	15	.....	.....	.....	N. W.	Clear	.....
28	16	—5	21	14	.....	.....	.....	N. W.	Clear	.....
29	20	4	16	24	.27	4	.....	N. E.	Cloudy	Snow
30	25	12	13	20	.....	.....	.....	N.	Cloudy	.....
31	36	20	16	19	.10	1	.....	N. W.	Cloudy	Snow
Sum	728	127	.....	....	4.96	23	.....	.....	.....	.....
Mean	23.5	4.1	.....	....	.....	.....	.....	.....	.....	.....

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 23.5; Mean minimum, 6; Mean, 14.3; Maximum, 48; Date, 19; Minimum, —18; Date, 14 and 26; Greatest daily range, 42.

Precipitation—Total 4.96 inches.

Snow—Total fall, 23 inches; on ground 15th, 8 inches; at end of month, 12 inches.

Number of Days—With .01 inch or more precipitation, 9; Clear, 14; Partly cloudy, 6; Cloudy, 11.

Meteorological Record: Month of February, 1912.

February, 1912.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set Maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	33	23	10	18	.....	.....	.....	N. W.	Cloudy	.....
2	33	17	16	18	.....	.....	.....	N. W.	Clear	.....
3	28	18	10	19	.....	.....	.....	W. N. W.	Clear	.....
4	18	5	13	12	.....	.....	.....	N. W.	Clear	.....
5	26	11	15	18	.....	.....	.....	N. W.	Clear	.....
6	29	16	13	22	.....	.....	.....	N. W.	Clear	.....
7	33	9	24	24	.....	.....	.....	N. W.	Cloudy	.....
8	29	12	17	20	.02	1	.....	N. W.	Cloudy	Light snow a. m.
9	20	2	18	16	.....	.....	.....	W.	Partly cloudy	.....
10	4	—7	11	0	.....	.....	.....	W. N. W.	Clear	.....
11	14	—8	22	12	.....	.....	.....	N. W.	Clear	.....
12	23	—14	37	10	.....	.....	.....	N. W.	Clear	.....
13	31	—8	39	18	.....	.....	.....	N. W.	Clear	.....
14	24	—8	32	15	.....	.....	.....	N. W.	Clear	.....
15	35	8	27	26	.....	.....	.....	S. E.	Partly cloudy	.....
16	29	24	5	28	.....	.....	.....	N. E.	Cloudy	.....
17	19	12	7	26	.....	.....	.....	N. E.	Clear	.....
18	38	26	12	31	.....	.....	.....	E. N. E.	Cloudy	.....
19	42	27	15	34	.....	.....	.....	E. N. E.	Cloudy	.....
20	34	23	11	25	.13	.....	.....	S. E.	Cloudy	Snow and rain
21	46	30	16	29	.....	.....	.....	N. W.	Cloudy	.....
22	47	24	23	34	1.02	.....	.....	S. W.	Cloudy	Rain
23	28	16	12	24	.....	.....	.....	N. W.	Clear	.....
24	46	18	28	34	.....	.....	.....	W.	Clear	.....
25	38	33	5	36	.....	.....	.....	N. W.	Cloudy	.....
26	36	22	14	30	.....	.....	.....	N. W.	Clear	.....
27	37	25	12	28	1.12	10	.....	N.	Cloudy	Snow
28	29	16	13	24	.....	.....	.....	N. W.	Clear	.....
29	29	18	11	22	.....	.....	.....	N. W.	Clear	.....
Sum	878	390	.....	....	2.29	11	.....	.....	.....	.....
Mean	30.3	13.3	.....	....	.....	.....	.....	.....	.....	.....

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 30.3; Mean minimum, 14.0; Mean, 22.2; Maximum, 47; Date, 22; Minimum, —14; Date, 12; Greatest daily range, 39.
Precipitation—Total, 2.29 inches; Greatest in 24 hours, 1.12; Date, 27.
Snow—Total fall, 11 inches.
Number of Days—With .01 inch or more precipitation, 4; Clear, 16; Partly cloudy, 2; Cloudy 11.

Meteorological Record: Month of March, 1912.

March, 1912.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡Miscellaneous phenomena
	Maximum.	Minimum.	Range.	* Set Maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground, at time of observation.			
1	23	6	17	18				W. N. W.	Clear	
2	19	10	9	16				N. W.	Clear	
3	21	—6	27	15				N. W.	Clear	
4	22	—4	26	15				N. W.	Clear	
5	23	6	17	10				N. W.	Clear	
6	33	—7	40	28				N. N. W.	Clear	
7	38	18	20	29	.04			N. E.	Cloudy	Fine rain
8	47	28	19	42				N. E.	Clear	
9	45	33	12	34				N. W.	Clear	
10	35	25	10	27				N. W.	Clear	
11	40	24	16	29				N. E.	Partly cloudy	
12	38	32	6	35				N. E.	Cloudy	
13	40	32	8	36	2.08			N. E.	Cloudy	Rain
14	48	34	14	35	.42			N. W.	Clear	Rain
15	54	32	22	37	.12			N. E.	Cloudy	Rain
16	52	33	19	35				N. W.	Clear	
17	48	23	25	39				S. E.	Clear	
18	37	32	5	35				S. E.	Cloudy	
19	54	30	24	42				S. W.	Clear	
20	58	33	25	44				S. W.	Cloudy	
21	18	16	2	24	.15	4		N. W.	Cloudy	Snow
22	30	16	14	29				N. W.	Clear	
23	38	17	21	34				N. W.	Clear	
24	34	26	8	30	1.40	9		N. E.	Cloudy	
25	38	29	9	37				N. E.	Clear	
26	37	7	30	24				N. W.	Clear	
27	46	20	26	42				S. W.	Clear	
28	58	25	33	50				S. W.	Clear	
29	45	37	8	41	.48			W.	Cloudy	Rain
30	46	28	18	29				N. W.	Clear	
31	64	22	42	40				S. W.	Clear	
Sum	1229	657			4.69	13				
Mean	39.7	21.2								

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 39.7; Mean minimum, 21.5; Mean, 30.6; Maximum, 64; Date, 31; Minimum, —7; Date, 6; Greatest daily range, 33.

Precipitation—Total 4.59 inches; Greatest in 24 hours 2.08; Date, 13.

Snow—Total fall, 13 inches.

Number of Days—With .01 inch or more precipitation, 7; Clear, 21; Partly cloudy, 1; Cloudy, 9

Meteorological Record: Month of April, 1912.

April, 1912.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	44	27	17	30				S. W.	Clear	
2	38	33	5	31				N. W.	Cloudy	Snow p. m.
3	40	30	10	34	.38	4		S. E.	Cloudy	
4	38	22	16	35	.10			W. N. W.	Cloudy	Snow and rain
5	67	26	41	43				S. W.	Clear	
6	56	44	12	46				S. W.	Partly cloudy	
7	68	37	31	42				E.	Cloudy	
8	44	23	21	36	.16			W.	Cloudy	Rain and snow
9	42	25	17	35				W.	Cloudy	
10	47	24	18	40				W. S. W.	Clear	
11	52	30	22	43				W.	Clear	
12	54	32	22	41				W.	Clear	
13	48	30	18	43				S. E.	Cloudy	
14	44	30	14	35	.09			E.	Cloudy	Rain
15	44	37	7	39				E.	Cloudy	
16	80	42	38	66				S. W.	Clear	
17	52	41	11	46				S. W.	Clear	
18										
19	49	38	11	45	.01			W.	Partly cloudy	
20	46	41	5	41				S. W.	Cloudy	
21	68	29	39	55				W.	Clear	
22	56	42	14	47	.26			S. E.	Cloudy	Rain
23	54	45	9	42				W.	Partly cloudy	
24	57	38	19	40				W.	Clear	
25	61	38	23	44				N. W.	Clear	
26	67	30	37	36				S. W.	Clear	
27	66	47	19	49	.23			S. W.	Cloudy	Rain
28	53	42	11	40				W. N. W.	Clear	
29	57	45	12	43				N. W.	Cloudy	
30	56	38	18	46				W.	Partly cloudy	
Sum	1548	1006			1.23	4				
Mean	51.6	33.5								

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 55.1; Mean minimum, 35; Mean, 45.1; Maximum, 80; Date, 16; Minimum, 22; Date, 4; Greatest daily range, 41.

Precipitation—Total, 1.23 inches; Greatest in 24 hours, .38; Date, 3.

Snow—Total fall, 4 inches.

Number of Days—With .01 inch or more precipitation, 7; Clear, 12; Partly cloudy, 4; Cloudy, 13.

Meteorological Record: Month of May, 1912.

May, 1912.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	71	28	43	60				S. E.	Clear	
2	58	40	18	46				E.	Partly cloudy	
3	67	40	27	44				S. E.	Clear	
4	66	47	19	49				S. E.	Clear	
5	54	49	5	46				S. E.	Clear	
6	53	45	8	44	.52			S. E.	Cloudy	Rain
7	54	43	11	46				S. E.	Cloudy	
8	49	42	7	44	.36			E.	Cloudy	Rain
9	67	45	22	50				S. E.	Clear	
10	67	49	18	50				S. E.	Partly cloudy	
11	78	39	39	67				N. W.	Clear	
12	68	47	21	61				S. E.	Cloudy	Showers p. m.
13	67	54	13	56	.20			S. E.	Cloudy	Rain
14	68	42	26	56				W.	Clear	
15	64	47	17	58	.03			W.	Clear	Shower p. m.
16	58	46	12	56	.53			S. E.	Cloudy	Rain
17	74	47	27	59				E.	Partly cloudy	
18	73	48	25	63				W.	Clear	
19	77	55	22	66				W.	Clear	
20	47	45	2	42	.27			N. W.	Partly cloudy	Thunderstorm p. m.
21	57	39	18	46	.32			N. N. E.	Cloudy	Thunderstorm
22	57	42	15	50	.13			S. E.	Partly cloudy	Rain
23	72	45	27	57				S. E.	Cloudy	
24	87	48	39	68	.19			S. W.	Partly cloudy	Thunderstorm
25	77	51	26	55				N. N. E.	Partly cloudy	
26	78	43	35	61				S. E.	Clear	
27	84	43	41	73				S. E.	Clear	
28	85	55	30	63				S. W.	Clear	
29	84	65	19	66				S. W.	Partly cloudy	
30	64	52	12	49	1.16			N. W.	Cloudy	Rain
31	58	47	11	49	.68			N. N. W.	Cloudy	Rain
Sum	2083	1428			4.41					
Mean	67.2	46								

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 67.2; Mean minimum, 46; Mean, 56.6; Maximum, 87; Date, 24; Minimum, 28; Date, 1; Greatest daily range, 43.
Precipitation—Total, 4.41 inches; greatest in 24 hours, 1.16; Date, 30.
Number of Days—With .01 inch or more precipitation, 11; Clear, 13; Partly cloudy, 8; Cloudy, 10.
Dates of—Thunderstorms, 20, 21, 24.

Meteorological Record: Month of June, 1912.

June, 1912.	Temperature.				Precipitation.			Prevailing wind direction.	Character of day.	‡ Miscellaneous phenomena.
	Maximum.	Minimum.	Range.	* Set maximum.	† Amount.	Snowfall in inches.	Depth of snow on ground at time of observation.			
1	75	46	29	62				N. W.	Clear	
2	92	53	39	74				W.	Clear	
3	83	66	17	66				W.	Clear	
4	87	56	31	65				S. W.	Clear	
5	68	53	15	57				S. W.	Clear	
6	69	43	26	56	.11			S. W.	Partly cloudy	Rain p. m.
7	63	50	13	48				N. W.	Clear	
8	72	34	38	57				N. W.	Clear	Frost in places.
9	65	42	23	54				N. W.	Clear	
10	73	40	33	54	.04			N. W.	Partly cloudy	Showers p. m.
11	78	48	30	65				N. E.	Clear	
12	74	60	14	59				W.	Clear	
13	61	47	14	50				N. W.	Clear	
14	63	43	20	47				N.	Clear	
15	63	36	27	56				S.	Clear	
16	73	52	21	58	.05			S. E.	Cloudy	Showers
17	85	55	30	70				S. W.	Partly cloudy	
18	73	57	16	62				N. W.	Clear	
19	76	51	25	62				N. W.	Clear	
20	77	47	30	54				S. S. E.	Partly cloudy	
21	78	53	25	59				N. N. W.	Clear	
22	70	57	13	50				N. W.	Clear	
23	87	48	39	75				W. N. W.	Clear	
24	88	52	36	80				W. N. W.	Clear	
25	91	58	33	75				N. W.	Clear	
26	87	67	20	54				S. W.	Partly cloudy	
27	72	51	21	54				N. W.	Clear	
28	78	47	31	50				S. E.	Clear	
29	90	67	23	70				N. W.	Clear	
30	71	47	24	61				N. W.	Clear	
Sum	2282	1526			.20					
Mean	76.1	50.8								

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

MONTHLY SUMMARY.

Temperature—Mean maximum, 76.1; Mean minimum, 51.2; Mean, 63.6; Maximum, 92; Date, 2; Minmum, 34; Date, 8; Greatest daily range, 39.

Precipitation—Total, .20 inches; Greatest in 24 hours, .11; Date, 6.

Number of Days—With .01 inch or more precipitation, 3; Clear, 24; Partly cloudy, 5; Cloudy, 1.

Meteorological Summary: 1895–1910 and 1909–1910.

	Average Temperature.			Precipitation.			Snow in Inches.			No. of Days with .01 Inch Precipitation.		
	July 1, 1895, to June 30, 1910.	1908–1909.	1909–1910.	Average July 1, 1895, to June 30, 1910.	1908–1909.	1909–1910.	Average July 1, 1895, to June 30, 1910.	1908–1909.	1909–1910.	Average July 1, 1895, to June 30, 1910.	1908–1909.	1909–1910.
July	69.3	71.6	67.6	3.19	3.16	1.73	.....	.....	.....	9	12	8
August	64.8	65.6	64.3	3.06	5.43	2.83	.....	.....	.....	8	10	4
September	60.1	62.9	59.8	4.30	1.05	4.34	.....	.....	.....	8	3	11
October	48.6	50.9	48.8	3.27	3.66	1.89	.....	.....	.....	7	4	4
November	37.4	37.9	46.7	3.28	1.43	2.47	3.2	1.5	2	8	6	6
December	25.6	26.0	27.8	3.75	3.27	2.91	11.5	7	13.5	8	6	5
January	21.9	25.6	24.8	4.24	1.93	2.90	14.3	12.5	8.5	8	6	9
February	22.8	25.9	28.7	3.33	4.03	2.94	14.5	1	48.5	7	6	5
March	31.7	32.7	37.8	3.77	1.34	.14	9.1	2	.....	8	5	4
April	44.7	42.0	44.0	3.40	3.45	2.47	2.4	.....	.....	9	11	10
May	54.9	53.3	51.6	2.70	1.66	1.27	.....	.....	.....	9	13	9
June	62.7	60.4	62.3	38.9	2.46	3.27	.....	.....	.....	9	7	9
Sum	544.5	554.9	564.2	42.18	32.87	29.16	55.0	24	72.5	98	89	84
Mean	45.4	46.2	47.0	3.51	2.74	2.43	.....	.....	.....	.....	.....	....

Meteorological Summary: 1895–1912 and 1911–1912.

	Average Temperature.			Precipitation.			Snow in Inches.			No. of Days with .01 Inch Precipitation.		
	July 1, 1895, to June 30, 1912.	1910–1911.	1911–1912.	Average July, 1895, to June 30, 1912.	1910–1911.	1911–1912.	Average July 1, 1895, to June 30, 1912.	1910–1911.	1911–1912.	Average July 1, 1895, to June 30, 1912.	1910–1911.	1911–1912.
July	69.7	70.7	73.5	3.21	1.79	4.96	.....	.....	.....	9	6	7
August	64.9	65.8	65.7	3.13	3.02	4.26	.....	.....	.....	8	7	7
September	59.8	59.1	58.5	4.14	2.76	3.09	.....	.....	.....	8	7	9
October	48.6	50.7	47.3	3.09	1.64	1.87	.....	.....	.....	7	6	8
November	37.4	36.9	36.2	3.20	2.01	3.16	2.8	.....	.....	8	7	6
December	25.8	20.9	33.1	3.60	1.39	3.61	11.1	16¾	.....	8	7	5
January	21.6	24.7	13.8	4.12	1.42	4.96	14.3	6	23	8	11	9
February	22.7	21.7	21.8	3.19	1.89	2.29	14.5	18½	11	7	7	4
March	31.4	28.8	30.5	3.67	1.23	4.59	9.6	14	13	8	7	7
April	44.6	42.8	42.5	3.15	1.27	1.23	3.1	13	4	9	3	7
May	55.3	58.6	56.6	2.71	1.10	4.41	.....	.....	.....	9	6	11
June	62.7	62.5	63.5	3.55	1.83	0.20	.....	.....	.....	9	6	3
Sum	544.5	543.2	551.1	40.76	21.35	58.65	55.4	68¼	51	98	80	83
Mean	45.4	45.2	45.9	3.39	1.78	3.22	.....	.....	.....	.....	.....	....

630.72
N532
no.152-168

DATE DUE

A fine of Two Cents will be charged for each day the book is kept overtime.

FEB 1 1 '59			
'60			
1 '60			

F32